



# 2007 Minerals Yearbook

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## CHINA

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# THE MINERAL INDUSTRY OF CHINA

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After three decades of economic development, China has become one of the leading economic and trade powers in the world, one of the top destinations for foreign direct investment, and an export destination of choice. During the past several years, the Government's economic policy was to prevent economic slowdown and fight inflation. In 2007, China's economic growth rate was 11.9% and represented the fifth consecutive year of double-digit expansion. Industrial production increased by 18.5% compared with that of 2006. The consumer price index (a measurement of inflation) rose to a decade high of 4.8%. To prevent economic "overheating," the Government raised interest rates and the People's Bank of China (the central bank) required commercial banks to increase the reserve-requirement ratio 11 times to 11.5% at yearend 2007. The Government abolished or reduced export tax rebates on certain products and imposed tariffs on some exports. During the past several years, rising labor and material input costs appeared to have no effect on the Chinese economy because the increase in productivity helped to absorb cost pressures; however, the global slowdown had started to affect China's growth by the end of 2007. High food and mineral commodity prices kept inflation elevated in 2007 and the high prices were expected to continue in 2008. The value of imported goods increased in 2007, including that of iron ore, which increased by 84%; oil, 62%; copper, 15%; and steel, 11% in 2007 (Zhonghua Renmin Gongheguo Guowuyuan Gongbao, 2008b).

China was widely seen as the country most responsible for increasing the demand for and the prices of mineral commodities and oil in recent years. The large majority of commodity prices in China were determined by the market, although they also followed international prices. The Government, however, strictly controlled prices on electricity, fuel products, and grain. With China's economy more interlinked with the global economy than in the past, such price gaps could be difficult to maintain in the future. In 2003, the Government suspended price controls to let domestic fuel prices respond to international prices, and only a few adjustments had been made since then. In 2007, the Government issued a ban on the upward adjustment of any administratively set prices. As international oil prices had risen to much higher levels, the price gap between domestic and international markets widened. This price gap led to increased losses on the sale of refined products by domestic refining and power generating enterprises. Given the disincentives to sell fuel products and to generate power, fuels and power shortages took place from time to time. In November 2007, the Government increased the production of refined products and was expected to increase the prices of refined products and power in 2008. The upward price adjustment would likely improve China's efficiency on energy consumption. Companies that depended heavily on oil and electricity could experience higher production costs, and more capacity would likely be idled. More idled capacity could mean less demand for oil and other commodities, which would

probably have some impact on the global commodity prices (Batson and King, 2008).

## Minerals in the National Economy

China is rich in mineral resources and was the world's leading producer of aluminum, antimony, barite, bismuth, coal, fluorspar, gold, graphite, iron and steel, lead, phosphate rock, rare earths, talc, tin, tungsten, and zinc in 2007. It ranked among the top three countries in the world in the production of many other mineral commodities. China was the leading exporter of antimony, barite, coal, fluorspar, graphite, rare earths, and tungsten in the world. The country's demand for chromium, cobalt, copper, iron ore, manganese, nickel, petroleum, and potash exceeded domestic supply, and imports were estimated to account for more than 30% of domestic consumption. Mineral trade accounted for 22.7% of the country's total trade in 2007. China was one of the few countries whose domestic demand and supply of a variety of mineral commodities affected the world mineral market. The labor force in the mining sector was 5.3 million, or 4.5% of the country's total workforce in 2006.

## Government Policies and Programs

The 11th National People's Congress (NPC) adopted the recommendations from the Communist Party of China to consolidate its bureaucracy by combining regulators into several larger ministries. The existing governmental structure had had difficulty responding quickly to shifting economic and social demands. The State Council hoped that the reform would build a more transparent and service-oriented Government. The State Council would have 27 ministries and commissions compared with the current 28. Fifteen agencies were involved in this reorganization. The Ministry of Environmental Protection was established to replace the State Environmental Protection Administration to implement environmental policies and standards, oversee environmental pollution control, and coordinate and solve major environmental problems. To strengthen the management of the energy sector, a National Energy Commission was formed to coordinate inter-ministerial energy development strategies and security. The actual functional activities of the commission would be performed by the newly established National Energy Bureau (NEB), which would be placed under the National Development and Reform Commission (NDRC). The NEB would manage the nuclear power-related functions formerly under the Commission of Science, Technology, and Industry for National Defense (NSTI), and the National Energy Leading Group. The NDRC would concentrate on macro-management of the country's economic activities; its role in examining and approving specific projects would decline. The Ministry of Industry and Information (MII) was established. The Bureau of Science, Technology, and Industry for National Defense was established under

MII to oversee activities other than nuclear power that were previously overseen by the NSTI. The Ministry of Information Industry, the State Council Information Working Office, and NSTI were disbanded. The Ministry of Human Resources and Social Security (MHRSS) was formed to integrate the functions of the Ministry of Personnel and the Ministry of Labor and Social Security, both of which would be dissolved. The State Administration of Foreign Experts Affairs would be part of the MHRSS. The Ministry of Transportation would be formed to integrate the functions of the Ministry of Communications, the General Administration of Civil Aviation, and the Ministry of Construction's functions on urban public transportation management. The Ministry of Housing and Urban-Rural Construction was established to replace the Ministry of Construction. The State Food and Drug Administration would be merged into the Ministry of Health. The Ministry of Finance would be reformed to improve its management of budgetary and taxation functions, and the central bank would strengthen its administration of monetary policies and the exchange rate mechanism (Zhonghua Renmin Gongheguo Guowuyuan Gongbao, 2008a).

The Chinese Government planned to reform its taxation system in 2008. The Government was expected to enact the unified enterprise income tax law, which was passed by the NPC in 2007. The Ministry of Finance set up guidelines to allow foreign companies to have a 5-year transitional period. The Government also planned to revise the individual income tax, the mineral resource tax, the property tax, and the value-added tax (VAT). On August 1, 2007, the Ministry of Finance and the State Administration of Taxation increased the resource tax, which was introduced in 1993, on mine output (per ton) of copper, lead, tungsten, and zinc. The resource tax on lead and zinc mine output was increased to between 10 yuan (\$1.32) and 20 yuan (\$2.64) from between 2 yuan (\$0.26) and 4 yuan (\$0.53). The resource tax on copper mine output was increased to between 5 yuan (\$0.66) and 7 yuan (\$0.93) from between 1.2 yuan (\$0.16) and 1.6 yuan (\$0.21), and that for tungsten mine output was increased to between 7 yuan (\$0.93) and 9 yuan (\$1.19) from between 0.5 yuan (\$0.07) and 0.6 yuan (\$0.08). During the period between 1996 and 2006, the Government had reduced the resource tax on the mine output of nonferrous metals by 30% to encourage investment in the nonferrous metal sector. In 2007, the Government reduced the iron ore resource tax by 40%, but increased the coal resource tax. The Government planned to alter the resource tax system so that the tax would be based on price instead of tonnage. The goal of this revision of the resource tax system would be to maximize the usage of the country's mineral resources, improve recovery efficiency, and reduce pollution of the environment. The Government also planned to change the VAT system so that consumption rather than production is taxed. Also enterprises would be allowed to deduct part of the VAT on the purchase of fixed assets. The Government planned to complete the reform of the taxation system during the 11th Five-Year Plan (2006-10) period (China Economic News, 2008d, e).

The Ministry of Commerce (MOC) and NDRC jointly issued the 2007 guidelines for foreign investment in China. The Government encouraged foreign investors to participate in

exploration and development of iron and manganese deposits. The Government encouraged Sino-foreign joint ventures on exploration and development of coalbed methane, natural gas, offshore gas hydrates, and oil, and use of new technology for oil recovery. In the MOC 2007 development guidelines for foreign investment, the development of bauxite, copper, lead, and zinc mines was no longer encouraged by the Government. Exploration for and exploitation of antimony, fluor spar, molybdenum, rare earths, tin, tungsten, and radioactive materials were forbidden. Exploration for and mining of diamond, gold, platinum-metals group and silver, and the mining of celestite, ludwigite, phosphate rock, and szaibelyite were restricted. The exploration for and mining of barite was limited to Sino-foreign joint ventures (China Economic News, 2008a).

On December 18, 2007, China State Oil Reserve Center was established under the NEB of the NDRC. The center would manage and construct the country's oil reserve bases. The construction of the oil reserve bases would be divided into three phases. According to the plan, the construction of four oil reserve bases—Dalian in Liaoning Province, Huangdao in Shandong Province, and Zhenhai and Zhoushan in Zhejiang Province—would be completed by 2010. The four bases would have a total of 10 million metric tons (Mt) to 12 Mt of oil storage capacity in the first phase. The second and third oil reserve base plans would include 28 Mt of oil storage capacity each. The total planned investment was estimated to be more than \$14 billion (China Economic News, 2008c).

In 2007, the State Council amended the Government regulation on the exploitation of onshore petroleum resources in cooperation with foreign enterprises. Under the amended regulation, China United Coalbed Co. Ltd. would take the lead in cooperating with foreign enterprises on coalbed methane development (Zhonghua Renmin Gongheguo Guowuyuan Gongbao, 2007a).

In China, the management of the country's foreign exchange reserves was scattered in different agencies, and investment of these funds was not coordinated efficiently. At yearend 2007, the country had foreign exchange reserves of more than \$1.4 trillion. The Government established the China Investment Corp. to manage the country's foreign exchange assets. The company had registered assets of \$200 billion. The company had two goals—to make investment in the international financial markets and to inject capital into domestic financial institutions. It would seek to obtain a higher rate of return on the Government's investments at an acceptable level of risk and to diversify the country's foreign investment. The company was expected to expand its investment by about \$100 billion to \$200 billion per year. The board of directors of China Investment Corp. included officials from different ministries and agencies; a seven-member committee of the board was set up to manage the daily operations of the company. Another mission of the company was to help state-owned enterprises expand their investment overseas and become multinational enterprises (China Economic News, 2007b).

The NDRC announced that the Government had discontinued the practice of giving preferential power rates to energy-intensive users, such as those that produce aluminum, ammonia, caustic soda, cement, copper, ferroalloys, yellow phosphorus,

and zinc. The Central Government's aim was to reduce excess output capacity, conserve natural resources, and decrease energy consumption. The NPC amended the 1997 Law of Conserving Energy in October 2007, which was scheduled to take effect on April 1, 2008; the amended law emphasizes the importance of energy conservation in the country and states that the Government should take the leading role in managing and enforcing energy conservation (National Development and Reform Commission, 2007b; *Zhonghua Renmin Gongheguo Guowuyuan Gongbao*, 2007b).

The NDRC published a mid- and long-term renewable energy development plan. By 2010, renewable energy consumption would account for 10% of the total energy consumption and, by 2020, the ratio would increase to 15%. In 2005, renewable energy consumption accounted for 7.5% of total energy consumption. By 2020, the hydropower installed capacity was expected to reach 300 gigawatts (GW); biomass and wind power, 30 GW each, and solar power, 1.8 GW. The use of renewable energy was expected to equal the use of 300 Mt of standard coal (one standard coal equivalent equals the thermal equivalent of 7,000 kilocalories per kilogram of fuel) by 2010 and 600 Mt of standard coal by 2020. The emission of carbon dioxide to the atmosphere was expected to be reduced by 600 Mt; sulfur dioxide, by 4 Mt; and nitrogen oxide, by 1.5 Mt in 2010; these emissions would be reduced by 1.2 billion metric tons (Gt), 8 Mt, and 3 Mt, respectively, in 2020. To meet this target, the Government was expected to invest \$290 billion in the development of renewable energy by 2020. The State Council also issued the energy development policy in 2007. The Government urged people to conserve energy, develop new technologies for saving energy, and cooperate with the international community on conservation and protection of the environment. The council's policy paper stated that the development of energy resources and the protection of the environment must be a balanced effort (National Development and Reform Commission, 2007a; State Council, *The*, 2007).

## Production

China was one of the world's leading countries in the production of aluminum, antimony, barite, bismuth, cement, coal, copper, fluorspar, gold, graphite, iron and steel, lead, lime, magnesium, manganese, molybdenum, phosphate rock, rare earths, silver, talc, tin, tungsten, and zinc. The output quantity of these commodities could have significant effects on the world market. In 2007, production of such commodities as aluminum, antimony, bismuth, coal, copper, gold, iron and steel, lead, magnesium, manganese, molybdenum, nickel, petroleum, phosphate rock, soda ash, tin, titanium, and zinc increased by more than 10% compared with production in 2006 (table 1). China's reform priorities were to improve the efficiency of resource allocation and to boost economic growth. The Government understood that the unbalanced growth of consumption, investment, and net exports could not continue forever. During the past several years, the Government reduced the export tax rebates on ferrous and nonferrous metal products, increased export duties on energy-intensive metals, and encouraged producers to produce high-valued-added products.

Owing to increasing domestic and overseas demand, the growth of China's minerals and metals output was expected to continue.

## Structure of the Mineral Industry

China's mining industry is highly fragmented and had a poor safety record. Several companies often mined in a single mining area. As a result, miners searched for resources and ignored laws and regulations regarding safety and the environment. The State Council approved a mining consolidation plan that had been proposed jointly by the Ministry of Land and Resources (MLR), the NDRC, and other agencies. Fifteen mineral commodities—antimony, bauxite, coal, copper, gold, iron ore, lead, manganese, molybdenum, phosphorus, potassium, rare earths, tin, tungsten, and zinc—were on the consolidation plan. The Central Government worked with local governments to implement the plan. Small mine operators were targeted to be integrated into large operators through such means as acquisition or joint-management agreements. The State Assets Administration would transfer state-owned assets of these small operators to the large operators. The Government would not allow any expansion of mining boundaries during the consolidation period, which was scheduled to be completed by yearend 2008. The Government would not issue mining operation permits to uncooperative mine operators. Local governments were required to submit their consolidation plans to the MLR for recording (China Metals, 2007).

## Mineral Trade

According to the customs statistics, China's total trade was valued at \$2.17 trillion in 2007; this was an increase of 23.2% compared with that of 2006. Exports posted an increase of 25.7% to \$1,218 billion, and imports were up by 20.8% to \$956 billion. The United States remained the leading destination for China's exports followed by the European Union (EU), Hong Kong, and Japan. Japan was China's leading source of imports followed by the Republic of Korea and the EU. Imports of raw materials, such as bauxite, chromium ore, iron ore, manganese ore, potassium fertilizer, and oil, increased sharply. In 2007, the total trade of minerals and metals increased to \$494.2 billion, which was an increase of 28.7% from that of 2006 (General Administration of Customs of the People's Republic of China, 2007).

The MOC issued circular No. 22, which included a list of mineral commodities that were banned for processing trade in 2008. Mineral commodities that were on the Government's monitoring list were ammonium paratungstate; bauxite and refractory clay; coal; coke; concentrates of antimony, cobalt, gold, silver, tin, tungsten, and zinc; dolomite; fluorspar; magnesite; oxides of antimony, magnesium, and tungsten; platinum; rare earths; silicon carbide; silver; talc; and unwrought metal and alloys of antimony, copper, nickel, tin, and zinc.

All antimony products would be required to be registered and exported through the Ports of Beihai in Guangxi Zhuangzu Autonomous Region, Huangpo in Guangdong Province, and Tianjin City. The Port of Dalian in Liaoning Province was designated as the port of issuance of export licenses

for magnesia, which could be exported through the Port of Changchun in Jilin Province; the Port of Dalian and Manshouli in Heilongjiang Province; and the Port of Qingdao in Shandong Province. The Government adjusted the 2008 export quota for magnesia, to 1.327 Mt; fluorspar, 550,000 metric tons (t); talc, 610,000 t; zinc and zinc products (metal content), 520,000 t; silicon carbide, 216,000 t; antimony and antimony products (metal content), 59,900 t; tin and tin products (metal content), 33,300 t; molybdenum, 26,300 t; tungsten and tungsten products (metal content), 14,900 t; silver, 4,800 t; and indium, 240 t. The MOC also issued guidelines for enterprises that had the right to supply and export antimony, coke, indium, molybdenum, rare earths, silver, and tungsten. The import quota for ammonium phosphoric acid was set at 6.90 Mt; complex fertilizer, 3.45 Mt; and urea, 3.30 Mt. Of the total imported volume, 3.80 Mt of ammonium phosphoric acid, 2.97 Mt of urea, and 1.76 Mt of complex fertilizer were assigned to state-owned enterprises. The Government reduced the import duty on alumina, aluminum metal, coal, and copper and copper products to zero. Between February 15, 2008, and September 30, 2008, the export tariff rate for monoammonium and diammonium phosphate would increase to 35% from 20%. The Government intended to discourage traders from exporting fertilizer products, which would help ensure sufficient supply and stabilize prices in the domestic market during the harvest period (Ministry of Commerce, 2007a-c; Ministry of Finance, 2007).

Owing to an increase in domestic demand and to conserve domestic mineral resources, the Government reduced export quotas on key commodities. Although export quotas for coal, coking coal, and rare earths were not publicly available, the announcement of the changes in the export allocations and an increase on tariffs for those commodities indicated that the export volume of the commodities would likely decrease in 2008 compared with that of 2007. The 2008 export duty rate of coke and semi-coke increased to 25% from 15% in 2007; the export duty of some rare-earth metals also increased to 25% from 10% in 2007. The initial export volume quotas announced by the Government for coal, coke, and rare earths were 31.60 Mt, 9.62 Mt and 22,780 t, respectively, which was 25%, 2%, and 5%, respectively, less than the quotas for 2007 (Ministry of Commerce, 2008a, b).

The Government intended to strengthen its control of gold and gold products in trade in 2008. Effective January 31, 2008, the Government required gold export and import traders to obtain a permit from the central bank to secure customs clearance. The new policy was aimed at controlling the smuggling of precious metals. Domestic scholars urged the Government also to strengthen its export control on such metals as antimony, gallium, germanium, indium, molybdenum, rare earths, tin, and tungsten. Even though data on the output of gallium and germanium in China were not available, aluminum producers started to recover gallium from their alumina production in the Provinces of Henan and Shandong. Germanium was recovered from coal, lead, and zinc production in the Provinces of Jiangsu and Sichuan and in Nei Mongol Autonomous Region (China Economic News, 2007a).

## Commodity Review

### Metals

**Aluminum.**—Despite the Government's macroeconomic policy to control the production of "overheated" commodities, the output of aluminum metal continued to increase rapidly. To support the aluminum sector, China imported large quantities of alumina to meet the demand. In 2003, the country imported 5.6 Mt of alumina, which accounted for about 50% of total demand. By 2006, the volume of imported alumina had increased to 6.9 Mt, but the imported alumina accounted for only about 34% of the country's demand. In 2007, the imported alumina decreased to 5.12 Mt, which was a 25.8% decrease from that of 2006. During the past several years, about 23 alumina projects were either completed or under construction and more than 10 alumina projects were in the feasibility stage. By yearend 2008, China's alumina output capacity could reach 33 million metric tons per year (Mt/yr). The rapid expansion of alumina output capacity could create fierce competition for bauxite resources. The Provinces of Guangxi, Guizhou, Henan, Shandong, and Shanxi accounted for about 90% of the country's bauxite resources. After years of exploitation, bauxite resources in Shandong Province were nearly depleted. Aluminum refineries in Shandong Province relied on imported bauxite to meet their demand. In 2007, China imported 23.26 Mt of bauxite compared with 9.68 Mt in 2006, mainly from, in descending order of amount imported, Indonesia, India, and Australia. During the past several years, China discovered several new bauxite deposits, including the Fusui and the Chongzuoshi deposits (both in Guangxi Zhuang Autonomous Region); the Cahuyuan and the Heitutian deposits at Qingzhen, the Luobuchong deposit at Zhijin, the Tianmashan deposit at Xiuwan, and the Wachangping deposit at Wuchuan (all in Guizhou Province); the Baode and the Jinggou deposits at Yangqu, and the Pangjianzhuang deposit at Jiaokou (all in Shanxi Province). China's aluminum producers were exploring for bauxite resources in such countries as Australia, Jamaica, and Vietnam (Inorganic Chemical Industry, 2008; Sun and Lu, 2008).

During the past 2 years, the NDRC approved several alumina projects. China Aluminum Co. Ltd. (Chalco) started construction of its greenfield 800,000-metric-ton-per-year (t/yr) aluminum refinery at Xing County, Luliang, Shanxi Province. Two more 800,000 t/yr aluminum refineries in Shanxi Province were expected to begin construction soon. One would be operated by Chalco at Long'erhui, Xiwatang, Cing County, and the other would be an expansion project by Shanxi Yangquan Coal Industry (Group) Co. Ltd. at its existing facility at Yangquan. Both companies would use the Bayer process, each would have a 50-megawatt (MW) power generating plant, and bauxite mines would be part of their development plans. After more than 2 years of construction, Yangquan commissioned its 1.2-Mt/yr aluminum refinery in December 2007. The Shanxi Provincial government allocated all local bauxite resources, except two mines, to support the project. About 90 Mt of bauxite reserves was discovered in the east part of Shanxi Province. Refineries were being constructed

by such companies as (in order of location) Chalco Nanchuan Aluminum Co. in Chongqing City; Chalco Zunyi Aluminum Co. in Guizhou Province; Guixi Huayin Aluminum Co. Ltd. in Guangxi Province; Henan Zhongmei Aluminum Co. Ltd., Huiyuan Chemical Engineering Co. Ltd., and Xinyuangfeng Industry Co. in Henan Province; Shanxi Wusheng Aluminum Co. Ltd. in Shanxi Province; and Yunnan Aluminum Co. Ltd.'s Wenshan plant in Yunnan Province. Expansion projects, including Chalco's Pingguo Aluminum Co. in Guangxi Province, the Zhengzhou Aluminum Plant and the Zhongzhou Aluminum Plant in Henan Province, and the Luneng Jinbei Aluminum Co. Ltd. in Shanxi Province, were planned. In 2008, China was expected to produce about 24 Mt of alumina, and by 2010, China's alumina output was expected to have increased sufficiently to meet domestic demand (China Nonferrous Metals, 2008a).

In 2007, despite the Government's macro-control policy, the country's aluminum output continued to increase by more than 30% compared with that of 2006. The rapid expansion of aluminum production was attributed to an increase in domestic demand, a higher profit margin, and the newly commissioned greenfield and brownfield aluminum smelter expansions. Owing to the shortage of power supply in the southwestern Provinces, several aluminum producers were forced to shut down their operations during the last 2 months of 2007; otherwise, China's aluminum output would likely have been much higher in 2007. To further control the expansion of aluminum output capacity, the Government eliminated all preferential power prices. In 2007, owing to the increased aluminum export duty rate, the export volume of aluminum metal decreased by 80% to 160,793 t; however, China's aluminum imports also decreased by 61% to 111,363 t compared with those of 2006. At yearend, the aluminum stockpile at the Shanghai Future Exchange warehouse increased to 69,716 t. In 2007, apparent aluminum consumption in China was 12.4 Mt, which was about 3.8 Mt more than in 2006. An increase in the consumption of aluminum was in part the result of increased usage by such sectors as construction, electric appliances, and power generation, and because many aluminum semimanufacture producers used aluminum ingot as their raw material instead of aluminum scrap. Many domestic analysts believed that traders exported aluminum ingot under the category of aluminum nonalloy bar, profile, and rod, which still enjoyed a VAT rebate of 8% to 11% of in early 2007. The Government cancelled the VAT rebate on bar and profile on July 1, 2007, and levied a 15% export duty on bar and rod. As a result, the export of these products decreased significantly during the second half of 2007. In 2008, owing to a higher export duty, exports of unwrought aluminum from China could decrease and imports of unwrought aluminum could increase because traders could take advantage of the new zero import duty policy. Most imported unwrought aluminum was expected to be used in the production of aluminum products, which would be exported on processing trade. China's aluminum metal output capacity was estimated to be about 15.5 Mt and was expected to increase to 17.5 Mt in 2008. Several aluminum expansion projects were expected to be completed in 2008, including the Baotou Aluminum Plant, the East China Aluminum Plant, the Henan Xichuan Aluminum

Plant, the Huomei Hongjun Aluminum Plant, the Kaili Yangguang Aluminum Plant, the Qingtongxia Aluminum Plant, the Renping Xinga Aluminum Plant, the Tianyuan Aluminum Plant, the Weiming Aluminum Plant, and the Weiqiao Aluminum and Power Plant (China Nonferrous Metals Monthly, 2008).

**Antimony.**—China was the leading antimony producing country in the world. Changes in the volume of China's production and exports could affect prices of antimony in the world market. During the past several years, China produced more than 100,000 t/yr of antimony metal and exported more than 60% of its output. China's antimony resources were located in the Provinces of Guangdong, Guangxi, Hunan, Sichuan, and Yunnan. The Provinces of Hunan and Guangxi were the top antimony producing Provinces in China and accounted for more than 50% of the country's total output. Owing to the expansion of smelting capacity during the past several years and to the Government's shutting down of many illegal mining activities in the Provinces of Guangxi, Hunan, and Yunnan, the supply of domestic antimony concentrates was insufficient to meet smelters' demand; therefore, the country was required to import a large quantity of antimony concentrates mainly from Kazakhstan and Turkmenistan. Antimony was considered one of the protected minerals; even with the Government's macro-control policy, however, antimony metal output continued to increase. In 2007, the Government announced that imported concentrates of antimony, cobalt, copper, lead, and nickel that contained gold were exempted from the VAT. The Government encouraged enterprises to import mineral resources from overseas and to protect domestic mineral resources. In 2007, China exported about 52,209 t of antimony oxide and 8,230 t of unwrought antimony; however, domestic traders indicated that a large volume of antimony products was exported through Vietnam to other countries illegally. China's antimony consumption was estimated to be about 30,000 t in 2007, which was about one-fifth of the total output. About one-third of antimony products were unaccounted for; therefore, the exported volume of antimony products was expected to be higher than the reported customs statistics. Domestic analysts estimated that the country's antimony consumption would increase to 65,000 t in 2010 and urged the Government to protect antimony resources, increase the export duty on antimony products, and limit the exported volume of antimony products to less than 30,000 t/yr (Chen, 2008; Zhao, 2008).

**Copper.**—Owing to domestic smelter and refinery expansions, China's copper output increased sharply during the past several years. Many domestic analysts believed that the rate of China's copper production would be slower than in previous years because of the constrained supply of copper concentrates on the world market and because Chinese copper smelters accepted a treatment charge/refining charge (TC/RC) of 60/6.0 in 2007, which was about 30% lower than that of 2006. China's copper producers had difficulty making a profit with such a low TC/RC because of increased production costs. In 2007, China's fixed asset investment in the nonferrous metal smelting industry was \$11.0 billion, of which the copper sector accounted for \$1.7 billion. China's leading copper producers planned to continue their output capacity expansions during the next several years. China's copper refining output capacity reached

3.7 Mt in 2007 and was expected to be 4.3 Mt in 2008. During the past several years, copper consumption in China increased by an average of more than 10% per year. The increase in copper consumption was caused by increased demand from the construction, electrical appliance, and power sectors. The power sector accounted for about 50% of the total copper consumption, and the demand was expected to continue to increase in the next several years as the electricity supply network throughout the country is expanded. In 2007, refined copper apparent consumption was estimated to be 4.87 Mt. In 2007, even though the price of copper increased to about \$8,300 per metric ton in June from \$5,300 per metric ton in January, China's refined copper imports reached 1.48 Mt, which was an increase of 80.5% from the previous year. The sharp increase in copper imports might have been to replenish inventory. The actual copper consumption in 2007, therefore, might have been about 4.5 Mt (China Metal Bulletin, 2008; China Metals, 2008c).

With Government approval to diversify its core operations, Aluminum Corporation of China (Chinalco) reached a strategic cooperation agreement with the government of Yunnan Province to acquire a 49% share of Yunnan Copper Group Co. Ltd. According to the terms of the agreement, Chinalco would inject \$1.6 billion into Yunnan Copper to build a 100,000-t/yr copper semimanufacturing plant. During the same period, Chinalco acquired a 91% share of Peru Copper Inc. of Canada. Chinalco planned to develop a copper deposit in Toromocho, Peru, which has 12 Mt of reserves (Copper and Nickel Monthly, 2007).

Shandong Yanggu Xiangguang Co. Ltd. commenced the second phase of its 200,000-t/yr greenfield copper refinery, which was scheduled to begin operations in 2008. After completion, Yanggu Xiangguang would have a total output capacity of 400,000 t/yr. Jinchuan Nonferrous Metals Group completed its copper expansion project, which increased its refined copper output capacity to 200,000 t/yr. Hengyang Jinhu planned to build a 50,000-t/yr refined copper plant in Hengyang, Hunan Province. Daye Nonferrous Metals Co. Ltd. planned to double its refined copper output capacity to 400,000 t/yr in 2010. Xinjiang Xinwang Mining Co. Ltd. started construction of its 10,000-t/yr blister copper plant in Hababe County, Altay Prefecture, Xinjiang Uygur Autonomous Region. Xinjiang Xiangdong Copper Co. Ltd.'s 36,000-t/yr blister copper plant was put into operation in Jinghe County, Bortala Prefecture, Xinjiang Uygur Autonomous Region. Chifeng Jinjian Copper Co. Ltd. planned to expand its refined copper output capacity at Chifeng, Nei Mongol Autonomous Region, to 60,000 t/yr in 2007 from 20,000 t/yr in 2006.

**Germanium, Lead, and Zinc.**—About 90% of China's known germanium resources are located in the Provinces of Guangdong, Guangxi, Guizhou, Jilin, Shanxi, Sichuan, and Yunnan, and Nei Mongol Autonomous Region. In China, germanium was produced as a byproduct of lead and zinc operations or was extracted from coal. Germanium was used mainly in the chemical, optical, and solar-cell-battery sectors. In June 2007, the Government revoked the VAT rebate on germanium oxide and reduced the VAT rebate on germanium metal and other products to 5% from 13%. In December 2007, the Government banned germanium oxide for export tolling trade and levied a 5% export duty. During the same period,

the Government placed germanium products under the export control list and required exporters to obtain export licenses. In China, the estimated germanium output capacity (metal content) was about 150 t/yr; however, no data on the production of germanium were available. In 2007, Japan imported 48 t of germanium oxide, of which about 50% was from China (Asia Metal, 2008).

Xilingol Tongli Germanium Refine Co. Ltd. was a joint venture of United States-based AXT Co., Nanjing Germanium Co. Ltd., and Xilin Gol Meng Wulantuga Coal Co. Ltd. (a subsidiary of Shenhua Coal Corp.). The company extracted germanium from Dongwu coal mine, which contained an average of 244 grams per metric ton (g/t) of germanium in coal. The company had an output capacity of 20 t/yr of germanium oxide, which placed it as China's second ranked coal-contained germanium extraction plant after Yunnan Lincang Xinyuan Germanium Co. Ltd. (Tongli Co., 2008).

China's zinc production continued to increase in 2007 compared with that of 2006. In 2007, about 300,000 t/yr of refined zinc output capacity was added to the sector. The increased production was attributable to an increase in the utilization ratio of refining output capacities by zinc producers. Other reasons were the greater supply and falling price of zinc concentrates in the domestic and international markets. At yearend 2007, the price of domestic zinc concentrates (50% Zn content) decreased to 12,000 yuan (\$1,667) per metric ton from 24,000 yuan (\$3,200) per metric ton at yearend 2006. Also, treatment charges of imported zinc concentrates increased to \$300 per metric ton in 2007 from \$100 per metric ton in 2006. In 2007, China imported 2.15 Mt of zinc concentrates, which was an increase of 259.7% from that of 2006; however, about 19% of the total imports were from North Korea. The value of imported zinc concentrates from North Korea was only 3% of the total, which might indicate that the zinc content of North Korea's zinc concentrates was much lower than the normal 50% zinc content and possibly that what was reported as zinc concentrates might actually have been zinc ore. In 2007, China's refined zinc exports and imports totaled 275,649 t and 149,490 t, respectively, and unwrought zinc alloy exports and imports totaled 1,065 t and 168,373 t, respectively. The supply of and demand for zinc (refined zinc and zinc content in alloy) was almost balanced, and the country consumed about 3.7 Mt of zinc in 2007 (China Metals, 2008a).

Owing to the Government's strictly controlled investment in lead and zinc smelting and refining capacity, the rate of growth in zinc production was expected to be lower than that of recent years. The Government banned obsolete equipment, such as indigenous blast furnaces, sintering pans, and sintering pots for lead smelting and horizontal tanks, indigenous muffles, and small vertical pots for zinc smelting by 2008. The Government planned to levy power surcharges on those producers that do not meet the environmental guidelines and the overall development policy set by the Government. Power shortages in such southern Provinces as Guangdong, Guizhou, Hunan, and Sichuan and natural disasters in central China also were expected to affect the output of zinc in 2008. In 2007, the Government adjusted the tariff for zinc products to the following rates: a 5% VAT rebate on high-grade zinc (zinc content equal to or higher than

99.995%), a 5% export duty on metal of not less than 99.99% zinc content, and a 15% export duty on metal of less than 99.99% zinc content. With the declining zinc prices in domestic and international markets, zinc producers might reconsider their output capacity expansion plans. China, which expected to have an output capacity of 4.9 Mt in 2008, was expected to produce about 4 Mt of zinc metal in that year (Lead, Zinc, and Tin Monthly, 2008).

China's lead production increased at a moderate pace. Exports of lead metal decreased to 235,758 t in 2007 from 537,092 t in 2006. The decrease in lead exports was attributable to the Government's removal of the 13% VAT rebate and the levying of a 10% export duty on refined lead in June 2007. China was a net lead concentrate importing country. In 2007, China imported 1.27 Mt of lead concentrates. High lead concentrate prices on the domestic and international markets affected the output of refined lead. About one-third of China's refined lead output was from secondary production. The Government intensified its efforts to crack down on polluting industries, and some primary and secondary producers halted their operations temporarily during the year. The lead battery manufacturing sector was the major consumer of lead, and the strong growth in China's automobile industry was expected to increase the consumption of lead in the future (China Metals, 2008f).

**Gold.**—After more than two decades of development, China has become one of the leading producers of gold in the world. China's gold sector was scattered and production was from small-scale producers. The Government made an effort to merge these small producers into larger groups so as to integrate their resources and eliminate outdated production capacity. The country's major gold producing areas were Bouyei-Miao Autonomous Prefecture in Qianxinan, Guizhou Province; Lingbao in Henan Province; Tongguan in Shaanxi Province; and Zhaoyuan in Shandong Province. In the mid-1980s, China's jewelry sector was very small and the annual value of sales was about \$24 million. In 2006, the value of sales by China's jewelry sector had increased to \$20 billion. According to the World Gold Council, China's gold consumption reached 328 t in 2007, which was a 26% increase compared with that of 2006, and China became the second ranked gold consuming country in the world after India. The jewelry sector accounted for 92% of the gold consumed in China. China's economic growth remained very strong, and Chinese consumers continued to purchase more gold even as gold prices remained at very high levels. Most Chinese consumers considered gold to be a good investment commodity against price inflation and dollar deflation. Purchases of 24-carat "pure gold" jewelry was considered to be one of the essential items for weddings and was a symbol of prosperity. Gold investment had become a popular investment strategy amongst Chinese financial planners, and several state-owned banks offered gold investment products for individuals in 2007. Gold production and consumption in China was expected to increase by 10% per year through 2010 (World Gold Council, 2008, p. 12).

Participation of foreign investors in China's gold exploration and mining was no longer encouraged in the Government's 2007 foreign investment directives. Since the 1990s, a number of foreign exploration and mining investors had gone to

China looking for gold deposits. Initially, the Government allowed foreign investors to participate in the gold sector where advanced technology was required to mine, process, and smelt gold. Foreign investors were not allowed to hold major shares in the project, however, except in the western part of the country, but these requirements were not enforced by the Government. Recently, three major gold deposits—Lannigou (Jinfeng) in Bouyei-Miao Autonomous Prefecture in Qianxinan, Guizhou Province; Maoling in Gaoxian County of Yingkou City, Liaoning Province; and Boka in Dongchuan, Yunnan Province—which had recoverable gold reserves of more than 100 t each, were controlled by foreign investors. The Chinese geological and prospecting departments of the Provincial governments offered mining and prospecting licenses as a condition of cooperation, and foreign investors offered capital. The Government considered that local and Provincial governments had failed to protect the country's mineral resources and that they did not follow the Government's policies on the development of the gold sector. To protect nonrenewable natural resources, the Government either strictly restricted or banned foreign investors from engaging in high-energy-using, material consuming, and highly polluting projects (China Economic News, 2008f).

**Iron and Steel.**—China was the world's leading producer of pig iron and crude steel. In 2007, China's steel production increased by more than 10%; domestic iron ore production, however, could not meet domestic demand. China depended on iron ore imports to fill the gap. Imports of iron ore increased to more than 383 Mt in 2007 from 326 Mt in 2006, mainly from, in descending order of amount imported, Australia, Brazil, India, South Africa, and Canada. During the past 5 years, domestic iron ore output increased sharply; owing to the low iron content of the ore, however, the iron ore supplied by domestic producers decreased to less than 50% of the demand in 2007 from 75% in the 1990s. Owing to China's increasing demand for iron ore, the contract prices of iron ore increased in 3 consecutive years, by 71.5% in 2005, 19.0% in 2006, and 9.5% in 2007 compared with each of the previous years (table 5). Owing to the rising production costs, the prices of domestic iron ore also increased during the past several years (China Metals, 2008e).

More than 300 integrated iron and steel enterprises and 1,500 steel producers operated in China, but some of their steel products did not meet the current demand. Only a small portion of China's steel products met the international standards. China's exported steel products were low value-added and low technology, such as long products, medium plates, and hot-rolled plates, and the country had to import high-end products, such as cold-rolled thin plates and electrical steel products. The Government urged iron and steel producers to eliminate surplus obsolete production capacity, create transregional enterprises, and reduce exports of low-end steel products. The Government also urged the iron and steel producers to replace their obsolete production capacity with advanced ironmaking and steelmaking equipment that consumes less energy and water and has less pollutant emissions.

The progress of transregional reorganization was moving very slowly because of the resistance of local governments. Many local governments depended on tax revenues from iron and steel producers to support local development. The Shandong



Provincial government merged the Province's two leading iron and steel companies—Jinan Iron and Steel Group and Laiwu Iron and Steel Group—to form the Shandong Iron and Steel Group and planned to build a 20-Mt/yr iron and steel plant in the coastal city of Rizhao. The Hebei Provincial government merged Handan Iron and Steel General Work (Hangang) and Tangshan Iron and Steel Co. (Tanggang) to form Hebei Iron and Steel Group. The governments of Hebei Province and Shandong Province intended to integrate other small iron and steel producers into these two groups. The merger of Hebei Province's steel companies could have an effect on the Central Government's transregional reorganization effort. Shoudu Iron and Steel (Group) Co. (Shougang) and Tanggang formed a joint-venture company, Shoutang Iron and Steel Co., to build a 10-Mt/yr iron and steel plant at Caofeidian, Hebei Province. The first phase of construction was scheduled to be completed in 2009. With the Government's approval, Shougang planned to relocate its entire iron and steel operations from Beijing to Hebei Province in 2012. The construction of the Baoshan Iron and Steel Group Corp. (Baogang) and the Hangang joint-venture hot-rolled plant was scheduled to be completed and the plant put into operation in July 2008. The two state-owned enterprises, Baogang and Shougang, were intending to acquire their joint-venture companies (China Metals, 2008d).

NDRC approved Baogang and Wuhan Iron and Steel (Group) Co. (Wugang) applications to build 10-Mt/yr integrated steel plants in Zhanjiang, Guangdong Province, and Fangchenggang, Guangxi Zhuangzu Autonomous Region, respectively. According to the Government's terms of approval for these projects, Wugang was required to submit a plan on how to phase out 5.4 Mt/yr of iron and steel output capacity in Guangxi Zhuangzu Autonomous Region and Baogang would be required to consolidate the Guangzhou Iron and Steel Group and Shaoguan Iron and Steel Co. and eliminate 10 Mt/yr of output capacity in Guangdong Province. Baogang planned to merge the two companies with its subsidiary, Baoshan Iron and Steel Co. Ltd. (Baosteel), to form a new enterprise, Guangdong Iron and Steel Group. Baogang had started the construction of a pellet plant in Zhanjiang in December 2007 in cooperation with Shaoguan and the Zhanjiang Port Group (China Metals, 2008b).

**Molybdenum.**—China's mined molybdenum output ranked it among the top three producers in the world. China's molybdenum resources were concentrated in the Provinces of Henan, Jilin, and Shaanxi. Together, these Provinces accounted for 76% of the country's reserves. China's molybdenum concentrates were mainly from the Provinces of Fujian, Henan, Liaoning, Shaanxi, and Zhejiang and Nei Mongol Autonomous Region. The Luanchuan area in Henan Province, the Huludao area in Liaoning Province, the Jinducheng area in Shaanxi Province, and the Qingtian area in Zhejiang Province were China's major molybdenum production bases. Molybdenum production from the Huludao area in Liaoning Province and the Qingtian area in Zhejiang Province had decreased sharply in recent years owing to environmental and safety problems. The Government tried to merge small and illegal miners in the Huludao area with larger entities. In 2007, the output volume of molybdenum concentrates increased significantly compared with that of previous years. Henan Province was

the leading mined molybdenum producing Province in China, and accounted for more than 50% of the total output; it was following by Shaanxi Province, 22%; Nei Mongol Autonomous Region, 6%; Hebei Province, Jiangxi Province, and Liaoning Province, 4% each; and Fujian Province, 3%. During the past several years, several molybdenum mine projects, such as the Fengning area and Laiyuan Dawan in Hebei Province, Ruyang Dongggu in Henan Province, Zhangjiajie in Hunan Province, Ganzhou in Jiangxi Province, Chifeng, Manzhouli, and Wulanchabu I (Ulaqab) in Nei Mongol Autonomous Region, and Wenquan in Xinjiang Uygur Autonomous Region, have been put into operation gradually. China's molybdenum production was expected to increase in the future (Peng, 2007; Xu Ai-hua, 2008).

Molybdenum was one of the four mineral commodities for which mining investment by foreign investors was restricted by the Government. On January 1, 2007, the Government increased export duties on molybdenum concentrates and molybdenum oxides, and ferromolybdenum to 10%, and on molybdenum powder, unwrought molybdenum, and scrap to 15%. On June 1, 2007, the Government raised the export duty on molybdenum concentrates and oxides to 15% and imposed a new export duty of 15% on molybdenum salts. On July 1, 2007, the Government cancelled the VAT rebate on molybdenum hydroxides and salts and ammonium molybdates and reduced the VAT rebate on molybdenum wire and other molybdenum products to 5%. In June 2007, the Government implemented an export quota system to regulate molybdenum exports. The Government granted export licenses only to those producers who met the Government's criteria. In 2007, molybdenum consumption in China was estimated to be about 40,000 t, of which the iron and steel sector accounted for 77%; chemicals, 15%; and alloys, 8%. China imported 14,695 t of molybdenum products, of which molybdenum concentrates accounted for 94% of the total volume, mainly from Chile, Mongolia, North Korea, and Peru. During the same period, China exported 55,835 t of molybdenum products, of which roasted molybdenum and ferromolybdenum accounted for 83% of the total volume in 2007 (Yang and Xu, 2008).

**Tin.**—China was the leading tin producing country in the world. Owing to increased domestic demand in China, Indonesia replaced China as the leading tin exporting country. Chenzhou in Hunan Province, Ganzhou in Jiangxi Province, Gejiu in Yunnan Province, and Liuzhou in Guangxi Zhuangzu Autonomous Region were the four principal tin bases; these bases accounted for about 70% of the total mined tin output and 90% of metal output. China's tin smelting capacity exceeded its mine output capacity; therefore, the country was required to import tin concentrates from such countries as, in order of volume (tonnage) of imports, Burma, Bolivia, Vietnam, and Laos. In 2007, China imported 20,697 t of tin concentrates and 12,888 t of refined tin and exported 23,477 t of refined tin. In addition, China also imported 14,498 t of tin products and 4,043 t of tin alloys and exported 3,370 t of tin products and 105 t of tin alloys. China appeared to become a net tin importing country in 2007. Tin was one of the Government's protected commodities. The Government cancelled the VAT rebate and levied a 10% export duty on refined tin. The export volume of

tin from China was expected to decrease in 2008; as a result, the volume of tin supply on the world market also decreased. The price of tin was expected to increase in 2008 and later years. The principal tin consumption sectors were electronics, glass, iron and steel, and packaging. China's tin consumption had increased to about 133,000 t in 2007 from 52,000 t in 2002 (Lin, 2008).

Yunnan Tin Group Co. Ltd., which was a state-owned enterprise under the supervision of the Yunnan Provincial government, was China's leading tin producer. In Gejiu, Yunnan Province, the company had a tin metal output capacity of 40,000 t/yr; tin products, 23,700 t/yr; and lead, 20,000 t/yr. Under the direction of the Yunnan Provincial government, Yunnan Tin consolidated all tin and other metals mining activities in the Gejiu area. Yunnan Tin acquired assets of the Wenshan Dulong Zinc and Tin Co. in Wenshan, Yunnan Province, and changed the company's name to Yunnan Hualian Zinc and Indium Co. Ltd. Yunnan Tin consolidated the majority of its tin mining and smelting activities in Yunnan Province. After many years of exploitation, the reserves of the tin mines in the Gujiu area were gradually being depleted. Yunnan Tin decided to explore and acquire tin prospects and deposits in other Provinces and overseas. The company acquired two tin mines and a smelter in Chenzhou, Hunan Province, and established YTC Investment Co. Ltd. and YTC Resources Co. Ltd. in Australia to explore for tin and other mineral resources in Australia. Yunnan Tin also invested in Indonesia. The company held a 51% share of Bangka-Belitung Tin Co. on Bangka Island, Indonesia; KJP Investment Pte. Ltd. (48.41%) and PT Bangka Global Mandiri (0.59%) held the remaining shares. Bangka-Belitung Tin Co. had a tin smelting output capacity of 20,000 t/yr. Yunnan Tin also formed a company, Indonesia-Yunnan No. 1 Mineral Co. Ltd., with KJP Investment Pte Ltd., PT Bangun Prima International, and PT Karya Abadi Selars to explore for and mine copper, lead, nickel, and tin in Indonesia. In Singapore, Yunnan Tin held a major share of a 20,000-t/yr tin refinery. Yunnan Tin signed a purchasing agreement with Ausmelt Co. Ltd. of Australia to acquire an Ausmelt furnace for its lead expansion project to increase its lead output capacity in Yunnan Province to 100,000 t/yr from 20,000 t/yr. The company developed a leaching process to process nickel laterite ore in Yunjiang at its Ganzhuang nickel refinery (China Nonferrous Metals, 2008b; Interfax Information Services, 2008).

**Titanium.**—In recent years, China's production of sponge titanium increased substantially and the country became one of the major titanium producing countries in the world. During the past 2 years, China transformed itself from a net importer to net exporter of sponge titanium. The production of sponge titanium in 2007 was nearly double that of 2006. Before 2000, there were two major sponge titanium producers—Fushun Titanium Co. Ltd. and Zunyi Titanium Co. Ltd.—which had a total combined output capacity of less than 10,000 t/yr. Between 2002 and 2005, owing to an increase in domestic demand and rising prices, domestic investors and state-owned enterprises decided to build greenfield plants or to expand existing plants. Owing to surplus sponge titanium in the domestic market, the price per metric ton of sponge titanium decreased to about \$13,500 in December from \$27,000 in January. In 2007, China exported 5,584 t and imported 1,133 t of sponge titanium. The

country consumed about 20,000 t, which was used to produce 23,640 t of titanium products. At yearend 2007, China's sponge titanium output capacity reached an estimated 75,000 t/yr and was expected to increase to 100,000 t/yr in 2010. Production of sponge titanium was expected to reach about 55,000 t by yearend 2008 (Titanium, Zirconium, and Hafnium Council, 2008).

Aricom plc, which was headquartered in London, and Chinalco signed an agreement to build a 30,000-t/yr sponge titanium plant in Jiamusi, Heilongjiang Province. The first phase of the plant would have an output capacity of 15,000 t/yr and was scheduled to be completed in 2009. Aricom held a 65% share in the plant, and Chinalco, 35%. Ilmenite would be sourced from Aricom's Kuranakh deposit in Amur Oblast, Russia. The joint-development sponge titanium project required NDRC approval. Zunyi Titanium and Fushun Titanium planned to expand their output capacities to 20,000 t/yr and 10,000 t/yr, respectively, during the next 2 years. In addition, several sponge titanium projects were either under construction or planned, including Panzhuhua Iron and Steel (Group) Co.'s 15,000-t/yr project in Panzhuhua, Sichuan Province; CITI's 10,000-t/yr project in Chaoyang, Liaoning Province; Yunnan Metallurgical Group's 10,000-t/yr project in Yunnan Province; and Zhongtian Co.'s 3,500-t/yr project in Gansu Province (Aricom plc, 2008; Rare Metals Letter, 2008).

Titanium tetrachloride is a raw material used in the Kroll process to produce sponge titanium. Of all sponge titanium producers, Fushun Titanium and Zunyi Titanium have titanium tetrachloride production plants; the others obtain titanium tetrachloride from domestic chemical producers. The price of titanium tetrachloride increased to \$2,500 per metric ton in 2006 from \$920 per metric ton at the end of 2004. In 2006, several chemical producers added titanium tetrachloride production lines in their facilities and the output capacity of titanium tetrachloride was expected to increase to 360,000 t by yearend of 2007. Owing to the expansion of output of titanium tetrachloride, the demand for high-titanium-content slag also increased and, as a result, titanium slag production in the Provinces of Hebei and Sichuan and Nei Mongol Autonomous Region was expected to increase. Owing to the rapid expansion of titanium tetrachloride output capacity and production, the price of titanium tetrachloride decreased to \$1,280 per metric ton at yearend 2007. Most titanium tetrachloride producers were located in the Provinces of Fujian, Hebei, Henan, Heilongjiang, Jiangsu, Liaoning, and Sichuan; however, most of the nonintegrated sponge titanium producers were located in the Provinces of Hebei, Henan, and Liaoning. During the past 2 years, transportation costs increased significantly, and market prices of sponge titanium declined sharply; as a result, many sponge titanium producers faced financial losses. Consolidation of the titanium tetrachloride and the sponge titanium sectors was expected in the near future (Xu Xuilan, 2008).

During the past 5 years, China's titanium oxide (titanium white) industry developed rapidly. By yearend 2006, there were more than 60 titanium oxide pigment producers with a combined output capacity of about 1.14 Mt/yr. Production of titanium oxide was mainly from ilmenite in the Provinces of Guangdong, Hainan, Hebei, Sichuan, and Yunnan and Guangxi Zhuang Autonomous Region. In Hebei Province and Sichuan

Province, titanium was recovered as a byproduct of ironmaking, in which the slag contained 47% to 48% titanium oxide. In China, titanium oxide was produced mainly from the sulfate process, which accounted for 98% of the total output capacity. In 2007, China produced about 1 Mt of titanium oxide, and ilmenite consumption was expected to be between 2.5 Mt and 3.0 Mt. Domestic ilmenite production was estimated to be about 1.2 Mt; therefore, the country depended on imports and on recovery of ferrotitanite ore. In 2007, China increased titanium white imports to 276,000 t and decreased exports to 138,000 t. In July 2007, the Government reduced the titanium white VAT export rebate to 0% from 13%, which led to the decline of titanium white exports. The Government listed production of titanium oxide as an energy-intensive and highly polluting sector and indicated that it should be strictly controlled. Domestic analysts estimated that throughput capacity of titanium oxide could reach 1.5 Mt in 2010. The leading output capacity expansions were Dupont Corp.'s 200,000-t/yr titanium oxide chloride process in Yingkou, Shandong Province; Pangang Titanium Co.'s 60,000-t/yr facility in Panzhihua, Sichuan Province; and a Province of Guangdong-based company's 50,000-t/yr plant in Kunming, Yunnan Province. The Government would not approve any greenfield titanium oxide plant of less than 50,000 t/yr and shut down small producers that did not meet the required environmental standards (China Chemical News, 2008a).

**Tungsten.**—China was the leading mined tungsten producing country in the world. Tungsten resources were discovered in 23 Provinces in the country; however, the Provinces of Hunan and Jiangxi accounted for 84% of the total output in recent years. In 1991, the Government announced that tungsten was a protected resource. Only the Central Government could issue exploration and mining permits. Private and individual entities were not allowed to participate in tungsten mining. In 2000, the Government assigned a total production target and production quota to each legal tungsten mine and to each Province. Fines would be levied if producers exceeded their assigned production quotas. The Government also assigned export quotas and approved traders who met export guidelines. During the past 5 years, the production target was an average of about 50,000 t/yr (65%  $WO_3$  equivalent); however, each year's output was more than 50% higher than the Government's production target. In 2007, the total production target was 59,270 t, of which 54,810 t was mined tungsten and 4,460 t was recovered as a byproduct of molybdenum production. In 2008, MLR set the tungsten production target at a total of 66,850 t (59,440 t mined and 7,410 t recovered). Owing to higher metal prices in the world market in recent years, domestic tungsten producers ignored the Government guidelines and expanded mining activities in some areas illegally. Government authorities had difficulty enforcing the guidelines, and some producers were willing to pay the fines to take advantage of high metal prices (Ministry of Land and Resources, 2007; Kong and others, 2008).

According to a survey by the China Tungsten Association, the country had output capacities of ammonium paratungstate (APT) of 161,000 t/yr; tungsten powder, 57,600 t/yr; tungsten hard alloy, 33,900 t/yr, ferrotungsten, 31,000 t/yr; and tungsten wire, 29.56 billion meters per year in 2007. China's major

export tungsten products were APT, ferrotungsten, tungsten carbonate and oxide, and tungstic acid. The Government encouraged producers to produce more value-added products and not to export raw materials; however, the output growth rates of APT and tungsten oxides were higher than those of hard alloy and wires. China imported a significant amount of tungsten concentrates mainly from (in descending order of amount imported) Canada, Russia, Congo, Thailand, and North Korea during the past 3 years. China consumed about 25,000 t of tungsten in 2007 and its level of consumption was expected to continue to increase in the future (Zhu, 2008).

Fujian Province-based Xiamen Tungsten Co. Ltd. completed the construction of its Ninghua Hangluokeng Tungsten Mine in Ninghua, Fujian Province. The mine had tungsten reserves of 4,000 t. The mine was designed to produce 4,000 t/yr of tungsten concentrates (a mixture of wolframite and scheelite) and 200 t/yr of molybdenum concentrate. Total investment was \$46 million. In 2007, the company signed a letter of intent with the Luoyang City government to establish Luoyang Yulu Mining Co. Ltd. to develop cemented tungsten carbide products in Luoyang, Henan Province (Precious and Minor Metals Monthly, 2007).

### *Industrial Minerals*

**Potash.**—China has limited potassium resources and must import a large quantity of potassium compounds for its fertilizer sector. Most potassium chloride producers were located in the Charhan area of Qinghai Province. During the past several years, production of potassium chloride increased to about 3.0 Mt in 2007 from 700,000 t in 2003, and the country's total output capacity reached about 3.3 Mt/yr in 2007. Owing to a shortage of supply in the domestic market and high imported prices in 2007, prices of potassium chloride increased to 3,100 yuan (\$443) per metric ton at yearend from 1,600 yuan (\$229) per metric ton at the beginning of the year. In 2007, China consumed about 11 Mt and imported 9.4 Mt of potassium chloride; and Canada and Russia provided 67% of the total imports. During the past decade, China's potassium chloride producers attempted to recover potassium resources from brine in the coastal areas; owing to high production costs, however, many of them shut down their operations. The country's potassium chloride demand was expected to increase to 16 Mt in 2010 (China Chemical News, 2008b).

In 2001, the Government approved the Xinjiang Lop Nur Potassic Salt Scientific and Technological Development Co.'s (also known as Xinjiang Luobupo Potash Co. Ltd.) plan to construct a 1.2-Mt/yr potassium sulfate and a 50,000-t/yr potassium nitrate plant in Luozhong, Ruoqiang County, Xinjiang Uygur Autonomous Region. The 100,000-t/yr potassium sulfate pilot plant was put into operation in 2004. Construction of the 1.2-Mt/yr potassium sulfate plant was begun in 2006 and was scheduled to be completed in late 2008. The company planned to expand the output capacity to 3 Mt/yr in 2014. The brine in Lop Nur Lake has an average of potassium chloride content of 1.4% and has potassium salt resources of 250 Mt, of which 100 Mt are recoverable reserves. During the past several years, more potassium resources were discovered in the surrounding areas (Liu and others, 2007; China Chemical Reporter, 2008).

**Salt.**—China, which produced marine salt, rock salt, and lake salt, was one of the leading salt producing countries in the world. Owing to rapid economic development in the coastal areas, many of the salt production bases had been changed into industrial development zones. The ratio of salt production among marine salt, rock salt, and lake salt changed to 55%, 35%, and 10%, respectively, in 2006 from 64%, 28%, and 8%, respectively, in 2001. In China, the alkali chloride and soda ash sectors accounted for about 85% of the total salt consumption. In 2001, China was a net salt exporting country. Owing to the rapid development of the alkali chloride and the soda ash industries during the past 5 years, domestic salt production could not meet the country's demand, and China has been a net salt importer since 2004. In 2007, China imported 1.59 Mt of raw salt, mainly from Australia and Mexico, and exported 586,600 t, mainly to Japan, the Republic of Korea, and North Korea. Because of the Government's macro-control policy on high-energy consuming sectors, the rate of expansion of alkali chloride and soda ash output capacity was expected to slow down compared with that of the salt sector during the next 2 years, and China could become a net salt exporting country in 2010 (China Chemical News, 2007).

**Sulfur.**—China has gradually become one of the leading sulfuric acid producing countries. Sulfuric acid was produced from native sulfur and pyrite, as a byproduct of oil and gas refining, and through the recovery of sulfur dioxide from nonferrous metal processing. About 70% of the sulfuric acid was used in fertilizer production. During the past decade, China's demand for phosphate fertilizer had grown rapidly and that for sulfuric acid also grew proportionally. Owing to environmental concerns, production of sulfuric acid from sulfur increased significantly to 22.3 Mt in 2006 from 8.2 Mt in 2001. China has limited sulfur resources and imported a significant quantity of sulfur to meet demand; imports of sulfur increased to 8.8 Mt in 2006 from 2.7 Mt in 2001, and were mainly from (in order of amount supplied) Canada, Saudi Arabia, the United Arab Emirates, Japan, and the United States. In 2007, the Government reduced the VAT on native sulfur production to 13% from 17% but the VAT on sulfur obtained as a byproduct of oil and gas refining and imported sulfur remained at 17%. The Fertilizer Association urged the Government to waive the VAT on sulfur as a way of encouraging oil and gas refiners to recover sulfur, which would help to protect the environment (Inorganic Chemical Industry, 2008).

### ***Mineral Fuels***

**Coal.**—China has undergone significant economic reform and has one of the world's fastest growing economies. Coal consumption has increased to meet the high demand for industrial production and power generation. Coal was the primary source of energy, and two-thirds of the electricity was produced by coal-fired plants. About 50% of the country's total coal output was consumed by the power sector. Electrification in China has grown very rapidly. In 2007, China added 95 GW of installed capacity and was scheduled to add 80 GW in 2008. Most of the increase would come from coal-fired plants. Even with the continued expansion of power-generating capacity,

many Provinces and cities faced blackouts from time to time. Owing to increased domestic demand, China's coal exports decreased to 53.17 Mt in 2007 from 63.30 Mt in 2006, and coal imports increased to 51.02 Mt in 2007 from 25.05 Mt in 2006. Before 2007, most coal imports were destined for Guangdong Province and Guangxi Zhuang Autonomous Region; however, eastern coastal Provinces, such as the Provinces of Fujian, Jiangsu, Shandong, and Zhejiang, started to import coal from overseas to meet internal demand. China's coal production bases have gradually shifted from the east to the west, thus making exports heavily reliant on rail transportation. The country's railway infrastructure, however, was not yet fully developed. In June 2007, the Government removed the import duty on coal to encourage companies to import coal and increased the export duty on coal to 15% from 5%. Effective January 1, 2008, the export duty on coke would increase to 25% from 15%. At yearend 2007, China's coal output capacity was about 2.74 Gt, and about 300 Mt output capacity would be added during 2008. The country was expected to produce 2.8 Gt of coal, and coal consumption would be between 2.7 Gt and 2.8 Gt in 2008 (China Economic News, 2008b).

In 2007, the NDRC issued coal industrial policy guidelines for the development of the coal sector. According to the guidelines, coal production bases in the eastern part of the country would remain as is. The Government would construct several large coal producing bases in the central part of the country and would increase its effort to explore for and develop coal resources in the west. During the same period, the NDRC indicated that 13 large coal bases would be developed in the Provinces of Anhui, Gansu, Guizhou, Hebei, Heilongjiang, Henan, Liaoning, Qinghai, Shaanxi, Shandong, Shanxi, Sichuan, and Yunnan and the Autonomous Regions of Nei Mongol, Ningxia, and Xinjiang. In Nei Mongol, Shaanxi, and Shanxi, the production capacity of new shaft construction must be larger than 1.2 Mt/yr. In Guizhou, Sichuan, and Yunnan and in Chongqing City, any new or expanded shaft must have an output capacity of greater than 150,000 t/yr. In Fujian, Guangxi, Hubei, Hunan, and Jiangxi, any new or expanded shaft must have an output capacity of greater than 300,000 t/yr. The Government would not approve any new shafts with less than 300,000 t/yr of output capacity in the period 2006-10. The 13 key coal bases would have a combined output capacity of 2.2 billion metric tons per year of coal. The Government would also restructure the coal sector. Six to eight companies would have output capacities of more than 100 Mt/yr each and ten would have output capacities of 50 Mt/yr each by 2010. The Government planned that only one coal company would mine in each key coal base. In addition, the Government also required companies to establish an energy-efficient management and clean coal production system, to develop comprehensive utilization of waste from coal mines, and to construct a power station in the pit. Coal continued to be a key energy source and would play an important role in the Chinese economy for the next 15 years. The Government allowed domestic power companies to participate in coal mining with coal companies. During the past 2 years, the price of coal increased by nearly 100% but the price of electricity was controlled by the Government. Because of the risk of inflation, the Government was reluctant to raise

the price of electricity to compensate for the rising price of coal. As a result, power producers faced significant financial losses (National Development and Reform Commission, 2007c).

## Outlook

Even while recovering from a series of recent natural disasters, China's economy is expected to continue to grow in the near future. The Government recognizes that the country cannot depend solely on exports to sustain its economic growth and that the country needs to increase domestic consumption and to have a more-transparent financial and legal system. The sustainability of China's growth implies that strong demand for commodities is likely to continue. China has shortages in the supply of most major minerals, such as bauxite, chromium, copper, iron, lead, manganese, nickel, oil, and potash, and relies on imports to meet the demand. This trend is expected to continue; therefore, the Government encourages enterprises to invest in such mineral-rich countries as Australia, Brazil, Burma, Chile, Indonesia, and Mongolia to secure minerals for domestic economic development and growth. The Government has been promoting the reduction of resource dependency and the production of higher value-added downstream products. Currently, the Government has not yet achieved great success in meeting this goal. As progress is made toward this goal, the country's dependency on most major commodities could decline. For the near term, however, China will likely continue to play an important role in the world's mineral and metal markets. Also, China's overseas investments will probably become a major phenomenon until the transition to resource independence takes place. China's overall outward investment is expected to continue to increase and may soon exceed inward foreign direct investment.

## References Cited

- Aricom plc, 2008, Titanium sponge project feasibility study & offtake agreements: London, United Kingdom, Aricom plc press release, January 10, 3 p.
- Asia Metal, 2008, 2007 germanium market report: Asia Metal, March 24, 8 p.
- Batson, Andrew, and King, Neil, Jr., 2008, China lifts fuel prices, and oil falls in response: *The Wall Street Journal*, June 20, p. A1, A10.
- Chen Jia-bin, 2008, Shortage of antimony resources and price values: *China Metal Bulletin*, no. 3, p. 21.
- China Chemical News, 2007, Price of raw salt remains low because the expansion too fast: *China Chemical News*, December 24, p. 9.
- China Chemical News, 2008a, China titanium oxide sector faces 5 problems: *China Chemical News*, January 28, p. 8.
- China Chemical News, 2008b, 2008—The gap of supply and demand of potassium chloride expands: *China Chemical News*, February 18, p. 11.
- China Chemical Reporter, 2008, Construction of potassium sulfate project went on smoothly: *China Chemical Reporter*, v. 19, no. 3, p. 13.
- China Economic News, 2007a, China to exercise strict control on strategic metal export: *China Economic News*, November 19, p. 19.
- China Economic News, 2007b, Establishment of China Investment Corporation, a symbol of China's forex management system reform: *China Economic News*, October 29, p. 17.
- China Economic News, 2008a, Catalogue of industries for guiding foreign investment (revised 2007): *China Economic News*, supplement 1, January 14, 31 p.
- China Economic News, 2008b, China expected to become a net coal import country this year: *China Economic News*, June 16, p. 25.
- China Economic News, 2008c, China sets up State Oil Reserve Center: *China Economic News*, January 14, p. 18.
- China Economic News, 2008d, China's reform of five major taxes in 2008: *China Economic News*, April 7, p. 22.
- China Economic News, 2008e, Circular of the State Council on implementing transitional preferential policy on enterprise income tax—Guofa (2007) no. 39: *China Economic News*, April 21, p. 23.
- China Economic News, 2008f, Several Chinese gold mines share controlled by foreign investors: *China Economic News*, February 18, p. 21.
- China Metal Bulletin, 2008, Review of 2007 copper market and forecast of 2008: *China Metal Bulletin*, no. 8, p. 5.
- China Metals, 2007, China to consolidate mines: *China Metals*, v. 13, no. 265, p. 16.
- China Metals, 2008a, Balanced zinc supply/demand expected in 2008: *China Metals*, v. 14, no. 288, p. 14.
- China Metals, 2008b, Both Wuhan Steel and Baosteel's projects win approval from NDRC: *China Metals*, v. 14, no. 292, p. 8.
- China Metals, 2008c, China factor continues playing: *China Metals*, v. 14, no. 288, p. 11.
- China Metals, 2008d, Hebei Province establishes large steel group: *China Metals*, v. 14, no. 298, p. 7.
- China Metals, 2008e, Iron ore prices rise, how serious will it affect China's steel industry: *China Metals*, v. 14, no. 290, p. 1.
- China Metals, 2008f, Lead exports shrink on tax change, slowing production: *China Metals*, v. 14, no. 288, p. 18.
- China Nonferrous Metals, 2008a, Alumina market review and outlook: *China Nonferrous Metals*, no. 7, p. 64.
- China Nonferrous Metals, 2008b, Yunxi new start: *China Nonferrous Metals*, no. 5, p. 50.
- China Nonferrous Metals Monthly, 2008, Summary of domestic aluminum market in 2007: *China Nonferrous Metals Monthly*, April, p. 1.
- Copper and Nickel Monthly, 2007, Chinalco moving toward a diversified metal company: *Copper and Nickel Monthly*, November, p. 1.
- General Administration of Customs of the People's Republic of China, 2007, China monthly exports and imports: Beijing, China, General Administration of Customs of the People's Republic of China, no. 12, 67 p.
- Inorganic Chemical Industry, 2008, How to deal with shortage of sulfur: *Inorganic Chemical Industry*, v. 40, no. 2, p. 61.
- Interfax Information Services, 2008, China Mining and Metals—Company profile, Yunnan Tin: Interfax Information Services, v. 7, issue 11, p. 18.
- Kong Zhao-qing, Liu Liang-xian, and Tian Xue-qin, 2008, Development report on China tungsten industry of 2007: *China Tungsten Industry*, v. 23, no. 2, p. 1-7.
- Lead, Zinc, and Tin Monthly, 2008, zinc market commentary: Lead, Zinc, and Tin Monthly, February, p. 3.
- Lin Guang-cai, 2008, Prices of tin continue to increase: *China Metal Bulletin*, no. 21, p. 10-13.
- Liu Chenglin, Jiao Pengcheng, Wang Mili, and Chen Yongzhi, 2007, Sedimentation of glauberite and its effect on potash deposit formation in Lop Nur salt lake: *Mineral Deposits*, v. 26, no. 3, p. 322-329.
- Ministry of Commerce, 2007a, Ministry of Commerce circular No. 76: Beijing, China, Ministry of Commerce, September 19, 2 p.
- Ministry of Commerce, 2007b, Ministry of Commerce circular No. 90: Beijing, China, Ministry of Commerce, October 23, 2 p.
- Ministry of Commerce, 2007c, Ministry of Commerce circular No. 121: Beijing, China, Ministry of Commerce, December 29, 2 p.
- Ministry of Commerce, 2008a, First batch coke export quota announcement: Beijing, China, Ministry of Commerce, January 15, 2 p.
- Ministry of Commerce, 2008b, First batch rare earths export quota announcement: Beijing, China, Ministry of Commerce, January 15, 2 p.
- Ministry of Finance, 2007, 2008 State Council Taxation Committee tariff rate: Beijing, China, Ministry of Finance, December 14, 20 p.
- Ministry of Land and Resources, 2007, Resource circular 71—2007 production quota for tungsten and rare earths announcement: Beijing, China, Ministry of Land and Resources, 3 p.
- National Development and Reform Commission, 2007a, Circular 2174—Announcement of renewable energy long- and mid-term development plan: Beijing, China, National Development and Reform Commission, August 31, 32 p.
- National Development and Reform Commission, 2007b, Circular 3550—Announcement of discontinued preferential power rate to energy intensive sectors: Beijing, China, National Development and Reform Commission, December 21, 8 p.
- National Development and Reform Commission, 2007c, National Development and Reform Commission announcement no. 80: Beijing, China, National Development and Reform Commission, November 23, 12 p.

- Peng Ru-qing, 2007, The situation and suggestion for the development of China molybdenum industry: China Molybdenum Industry, v. 31, no. 5, p. 9-11.
- Precious and Minor Metals Monthly, 2007, Chinese No. 1 tungsten mine commissioned in Ninghua, Fujian: Precious and Minor Metals Monthly, December, p. 11.
- Rare Metals Letter, 2008, 2007 China's titanium industry increased explosively: Rare Metals Letter, v. 27, no. 3, p. 46.
- State Council, The, 2007, China energy situation and policy: Beijing, China, The State Council, December, 35 p.
- Sun Zhi-wei and Lu Ai-li, 2008, Status quo and issue and countermeasures of bauxite exploitation in our country: China Mining Magazine, v. 17, no. 5, p. 13-15.
- Titanium, Zirconium, and Hafnium Council, 2008, 2007 China titanium production, import and export news: Titanium, Zirconium, and Hafnium Council news release, January 31, 1 p.
- Tongli Co., 2008, Company brief: Xilinhot, China, Tongli Co. press release, 2 p.
- World Gold Council, 2008, Gold demand trend—Full year and fourth quarter 2007: London, United Kingdom, February, 21 p.
- Xu Ai-hua, 2008, Firm and stable price dominates global molybdenum market: China Molybdenum Market, v. 32, no. 1, p. 48-54.
- Xu Xiulan, 2008, Review and analysis of the titanium tetrachloride market in China in 2007 and forecast for 2008: Rare Metals Letter, v. 27, no. 2, p. 14-16.
- Yang Jian-she and Xu Jie-yu, 2008, Analysis of import and export for China molybdenum products in 2007: China Molybdenum Industry, v. 32, no. 1, p. 57-59.
- Zhao Zhen-jun, 2008, The target of mined antimony output and suggestion on how to protect: China Metal Bulletin, no. 21, p. 5-6.
- Zhonghua Renmin Gongheguo Guowuyuan Gongbao, 2007a, Decree of the State Council of the People's Republic of China No. 506: Zhonghua Renmin Gongheguo Guowuyuan Gongbao, no. 31, p. 7-10.
- Zhonghua Renmin Gongheguo Guowuyuan Gongbao, 2007b, Order of the President of the People's Republic of China No. 77—Law of the People's Republic of China on conserving energy: Zhonghua Renmin Gongheguo Guowuyuan Gongbao, no. 35, p. 31-37.
- Zhonghua Renmin Gongheguo Guowuyuan Gongbao, 2008a, Announcement of State Council agencies: State Council, Zhonghua Renmin Gongheguo Guowuyuan Gongbao, no. 15, p. 35-38.
- Zhonghua Renmin Gongheguo Guowuyuan Gongbao, 2008b, Report on the implementation of the 2007 plan for national economic and social development and on the 2008 draft plan for national economic and social development: National Development and Reform Commission, Zhonghua Renmin Gongheguo Guowuyuan Gongbao, no. 13, p. 16-26.
- Zhu Xiu-sheng, 2008, Analysis of export and import tungsten products in 2007: China Metal Bulletin, no. 8, p. 17-21.

TABLE 1  
CHINA: ESTIMATED PRODUCTION OF MINERAL COMMODITIES<sup>1,2</sup>

(Metric tons unless otherwise specified)

Commodity <sup>3</sup>	2003	2004	2005	2006	2007	
<b>METALS</b>						
<b>Aluminum:</b>						
Bauxite, gross weight	thousand metric tons	13,000	17,000	22,000	27,000	30,000
Alumina	do.	6,110	6,990	8,540	13,700	19,500
<b>Metal, refined</b>						
Primary	do.	5,970	6,900	7,800	9,360	12,600
Secondary	do.	1,450	1,660	1,940	2,350	2,750
Total	do.	7,420	8,560	9,740	11,700	15,400
<b>Antimony:</b>						
Mine, Sb content		100,000	125,000	152,000	153,000	163,000
Metal		90,000	125,000	138,000	140,000	147,000
<b>Bismuth:</b>						
Mine output, Bi content		2,500	3,000	3,000	1,520	3,500
Metal		5,000	11,700	10,600	11,800	12,100
Cadmium, smelter		2,700	4,530	4,080	3,790	4,210
Chromite, gross weight	thousand metric tons	200	200	200	200	200
<b>Cobalt:</b>						
Mine output, Co content		700	1,260	2,100	1,840	6,100
Metal		990	5,600	7,150	8,200 <sup>r</sup>	7,580
<b>Copper:</b>						
Mine output, Cu content		610,000	742,000	762,000	873,000	928,000
<b>Metal:</b>						
Smelter, primary	thousand metric tons	1,380	1,500	1,750	1,920	2,110
<b>Refined:</b>						
Primary	do.	1,420	1,580	1,850	2,000	2,400
Secondary	do.	430	620	750	1,000	1,200
Total	do.	1,850	2,200	2,600	3,000	3,600
Gold, mine output, Au content		205	215	225	245	275
Indium		180	200	300	350	320
<b>Iron and steel:</b>						
Iron ore, gross weight	thousand metric tons	261,000	320,000	420,000	601,000	707,000
Pig iron	do.	213,670 <sup>4</sup>	251,850 <sup>4</sup>	343,750 <sup>4</sup>	412,450 <sup>4</sup>	469,440 <sup>4</sup>
Ferroalloys	do.	6,340	8,670	10,700	14,300	17,500
Steel, crude	do.	222,340 <sup>4</sup>	272,800 <sup>4</sup>	353,240 <sup>4</sup>	419,150 <sup>4</sup>	489,240 <sup>4</sup>
Steel, rolled	do.	241,080 <sup>4</sup>	297,230 <sup>4</sup>	377,710 <sup>4</sup>	468,930 <sup>4</sup>	564,600 <sup>4</sup>
<b>Lead:</b>						
Mine output, Pb content		955,000	998,000	1,140,000	1,330,000	1,410,000
<b>Metal:</b>						
Smelter, primary		1,280,000	1,460,000	1,790,000	2,090,000	2,040,000
<b>Refined</b>						
Primary		1,290,000	1,510,000	1,850,000	2,130,000	2,000,000
Secondary		290,000	430,000	537,000	590,000	800,000
Total		1,580,000	1,940,000	2,390,000	2,720,000	2,800,000
Magnesium, metal and alloy		342,000	442,000	470,000	520,000	625,000
<b>Manganese:</b>						
Ore, Mn content	thousand metric tons	920	1,100	1,500	1,600	2,000
Metal		320,000	492,000	566,000	730,000	1,000,000
Mercury, mine output, Hg content		610	1,140	1,100	760	800
Molybdenum, mine output, Mo content		31,000	38,500	40,000	43,900	67,700
<b>Nickel:</b>						
Mine output, Ni content		61,000	75,600	72,700	82,100	85,000
Matte		69,300	74,000	83,500	99,800	105,000
Smelter		64,700	75,800	95,100	102,000	116,000
Silicon, metal		680,000	750,000	840,000	900,000	950,000
Silver, mine output, Ag content		2,400	2,450	2,500	2,600	2,700

See footnotes at end of table.

TABLE 1—Continued  
CHINA: ESTIMATED PRODUCTION OF MINERAL COMMODITIES<sup>1,2</sup>

(Metric tons unless otherwise specified)

Commodity <sup>3</sup>	2003	2004	2005	2006	2007	
<b>METALS—Continued</b>						
<b>Tin:</b>						
Mine output, Sn content	102,000	118,000	126,000	126,000	146,000	
Metal	98,000	115,000	122,000	132,000	149,000	
<b>Titanium:</b>						
Ilmenite, TiO <sub>2</sub> equivalent	400,000	420,000	450,000	500,000	550,000	
Sponge	4,120	4,810	9,160	18,100	42,000	
Tungsten, mine output, W content	36,200 <sup>r</sup>	59,900 <sup>r</sup>	51,200 <sup>r</sup>	45,000 <sup>r</sup>	41,000	
Vanadium, in vanadiferous slag product	35,000	40,000	42,500	42,500	45,200	
<b>Zinc:</b>						
Mine output, Zn content	thousand metric tons	2,030	2,390	2,550	2,840	3,040
Refined, primary and secondary	do.	2,320	2,720	2,780	3,170 <sup>r</sup>	3,740
<b>INDUSTRIAL MINERALS</b>						
Asbestos	500,000	400,000	400,000	360,000 <sup>r</sup>	380,000	
Barite	thousand metric tons	3,600	3,900	4,200	4,400	4,400
Bentonite	do.	2,800	3,000	3,100	3,200	3,300
Boron, mine, B <sub>2</sub> O <sub>3</sub> equivalent	130,000	135,000	140,000	145,000	145,000	
Bromine	75,000 <sup>r</sup>	80,000 <sup>r</sup>	104,000 <sup>r</sup>	124,000 <sup>r</sup>	130,000	
Cement, hydraulic	thousand metric tons	862,080 <sup>4</sup>	970,000 <sup>4</sup>	1,068,850 <sup>4</sup>	1,236,770 <sup>4</sup>	1,354,120 <sup>4</sup>
Diatomite	380,000	390,000	410,000	420,000	420,000	
Dolomite	thousand metric tons	7,300	7,500	7,800	8,000	8,000
Feldspar	do.	1,700	1,800	1,900	1,950	2,000
Fluorspar	do.	2,650	2,700	2,800 <sup>r</sup>	3,000 <sup>r</sup>	3,200
Graphite	710,000	700,000	720,000	720,000	800,000	
Gypsum	thousand metric tons	27,000 <sup>r</sup>	29,000 <sup>r</sup>	32,000 <sup>r</sup>	35,000 <sup>r</sup>	37,000
Kaolin	do.	3,700	3,750	3,800	3,800	3,850
Lime	do.	130,000	140,000	150,000	160,000	170,000
Lithium minerals, all types	17,000	18,000	19,000	20,000	22,000	
Magnesite	thousand metric tons	4,900	6,500	6,600	6,700	8,000
Nitrogen, N content of ammonia	do.	31,500 <sup>4</sup>	34,770 <sup>4</sup>	37,850 <sup>4</sup>	40,660 <sup>4</sup>	42,480 <sup>4</sup>
Phosphate rock, P <sub>2</sub> O <sub>5</sub> equivalent	do.	7,550	7,650	9,130	11,600	15,100
Potash, marketable, K <sub>2</sub> O equivalent	do.	625	770	1,500	1,800	2,000
Rare earths, rare-earth oxide equivalent	92,000	98,000	119,000	133,000	120,000	
Salt	thousand metric tons	34,377 <sup>4</sup>	37,100 <sup>4</sup>	46,610 <sup>4</sup>	56,630 <sup>4</sup>	59,760 <sup>4</sup>
<b>Sodium compounds:</b>						
Mirabilite	do.	5,800	6,300	6,300	6,500	6,600
Soda ash, natural and synthetic	do.	11,336 <sup>4</sup>	13,024 <sup>4</sup>	14,211 <sup>4</sup>	15,600 <sup>4</sup>	17,720 <sup>4</sup>
Strontium carbonate	240,000	270,000	300,000	320,000	330,000	
<b>Sulfur:</b>						
Native	thousand metric tons	700	820	900	950	960
Content of pyrite	do.	3,400	3,730	4,010	3,810	4,200
Byproduct, all sources	do.	2,400	2,600	2,800	3,000	3,300
Total	do.	6,500	7,150	7,710	7,760	8,460
Talc and related materials	do.	2,400	2,200	2,300	2,400	2,400
<b>MINERAL FUELS AND RELATED MATERIALS</b>						
<b>Coal:</b>						
Anthracite	thousand metric tons	304,000	464,000	487,000	510,000	530,000
Bituminous	do.	1,360,000	1,450,000	1,670,000	1,700,000	1,900,000
Lignite	do.	63,000	80,000	98,000	110,000	120,000
Total	do.	1,730,000	1,990,000	2,260,000	2,320,000	2,550,000
Coke, all types	do.	138,800 <sup>4</sup>	177,480 <sup>4</sup>	232,820 <sup>4</sup>	280,540 <sup>4</sup>	328,940 <sup>4</sup>
<b>Gas, natural:</b>						
Gross	billion cubic meters	35	41	50	59	62
Marketed	do.	28	34	42	51	52

See footnotes at end of table.



TABLE 1—Continued  
 CHINA: ESTIMATED PRODUCTION OF MINERAL COMMODITIES<sup>1,2</sup>

(Metric tons unless otherwise specified)

Commodity <sup>3</sup>	2003	2004	2005	2006	2007
<b>MINERAL FUELS AND RELATED MATERIALS—Continued</b>					
<b>Petroleum:</b>					
Crude, including crude from oil shale      million 42-gallon barrels	1,260	1,300	1,350	1,400	1,650
Refinery products      do.	2,500	2,600	2,800	3,000	3,500

<sup>1</sup>Revised. do. Ditto.

<sup>2</sup>Estimated data are rounded to no more than three significant digits; may not add to totals shown.

<sup>2</sup>Table includes data available through August 29, 2008.

<sup>3</sup>China also produces diamond, gallium, germanium, platinum-group metals, stone, and uranium, but available information is inadequate to make reliable estimates of output.

<sup>4</sup>Reported by China's State Statistical Bureau.

TABLE 2  
CHINA: STRUCTURE OF THE MINERAL INDUSTRY IN 2007

(Thousand metric tons unless otherwise specified)

Commodity	Major operating companies <sup>1</sup>	Location of main facilities	Annual capacity <sup>c</sup>
Aluminum:			
Alumina	Chongqing Dingtai Tuoyuan Alumina Co.	Chongqing	150
Do.	Nanchuan Pioneer Alumina Co.	do.	150
Do.	Pingguo Aluminum Co. [Aluminum Corporation of China (Chinalco)]	Guangxi, Pingguo	1,200
Do.	Guizhou Aluminum Plant [Aluminum Corporation of China (Chinalco)]	Guizhou, Guiyang	1,200
Do.	Guanxiangxia Aluminum Co. Ltd.	Hebei, Yicheng	200
Do.	Luoyang Wanji Xiangjiang Aluminum Co. Ltd.	Henan, Luoyang	1,200
Do.	Yixiang Aluminum Co. (Henan Yima Coal Group)	Henan, Mainchi	600
Do.	Pingdingshan Huiyuan Chemical Co.	Henan, Pingdingshan	300
Do.	Yangquan Coalmine Aluminum (Sanmenxia) Co. Ltd.	Henan, Sanmenxia	1,200
Do.	East Hope (Sanmenxia) Aluminum Co. Ltd.	do.	1,200
Do.	Zhengzhou Aluminum Plant [Aluminum Corporation of China (Chinalco)]	Henan, Zhengzhou	2,600
Do.	Zhongzhou Aluminum Plant [Aluminum Corporation of China (Chinalco)]	Hunan, Zhongzhou	3,000
Do.	Bingzhou Weiqiao Aluminum Co.	Shandong, Zouping	1,600
Do.	Shandong Huayu Alumina Co. Ltd. (Shandong Chiping Xinfu Aluminum and Electricity Group)	Shandong, Chiping	1,800
Do.	Shandong Aluminum Plant [Aluminum Corporation of China (Chinalco)]	Shandong, Zibo	1,500
Do.	Shanxi Aluminum Plant [Aluminum Corporation of China (Chinalco)]	Shanxi, Hejin	2,200
Do.	Shanxi Luneng Jinbei Aluminum Co. Ltd.	Shanxi, Yuanping	1,000
Metal	Baiyin Aluminum Plant	Gansu, Baiyin	150
Do.	Lanzhou Aluminum Plant	Gansu, Lanzhou	210
Do.	Liancheng Aluminum Plant	do.	235
Do.	Pingguo Aluminum Co. [Aluminum Corporation of China (Chinalco)]	Guangxi, Pingguo	380
Do.	Guizhou Aluminum Plant [Aluminum Corporation of China (Chinalco)]	Guizhou, Guiyang	400
Do.	Henan Zhongfu Industry Co. Ltd.	Henan, Gongyi	180
Do.	Jiaozuo Wanfang Aluminum Co. Ltd.	Henan, Jiaozuo	420
Do.	Henan Wanji Aluminum Co. Ltd.	Henan, Luoyang	180
Do.	Henan Zhongmai Mianchi Aluminum Plant	Henan, Mianchi	400
Do.	Sanmenxia Tianyuan Aluminum Co. Ltd.	Henan, Sanmenxia	110
Do.	Shangqiu Aluminum Smelter	Henan, Shangqiu	180
Do.	Yichuan Yugang Longquan Aluminum Co.	Henan, Yichuan	600
Do.	Henan Shenhua Aluminum-Electricity Co. Ltd.	Henan, Yongcheng	200
Do.	Zhengzhou Aluminum Plant [Aluminum Corporation of China (Chinalco)]	Henan, Zhengzhou	60
Do.	Hanjiang Danjiangkou Aluminum Co. Ltd.	Hubei, Danjiangkou	110
Do.	Hunan Chuanquan Aluminum Co. Ltd.	Hunan, Taoyuan	210
Do.	Fushun Aluminum Plant	Liaoning, Fushun	190
Do.	Baotou Aluminum Plant	Nei Mongol, Baotou	250
Do.	East Hope Aluminum Plant	Nei Mongol, Baotou	330
Do.	Qingtongxia Aluminum Plant	Ningxia, Qingtongxia	560
Do.	Qiaotou Aluminum Co. Electrolysis Branch	Qinghai, Datong	350
Do.	Qinghai Aluminum Smelter [Aluminum Corporation of China (Chinalco)]	Qinghai, Xining	560
Do.	Qinghai West Mining Baihe Aluminum Co. Ltd.	do.	112
Do.	Tongchuan Xingguang Aluminum Co. Ltd.	Shaanxi, Tongchuan	250
Do.	Shandong Chiping Xinfu Aluminum and Power Group	Shandong, Chiping	360
Do.	Taishan Aluminum-Power Co. Ltd.	Shandong, Fecheng	125
Do.	Shandong Nanshan Industry Co. Ltd.	Shandong, Longkou	280
Do.	Shandong Aluminum Plant [Aluminum Corporation of China (Chinalco)]	Shandong, Zibo	120
Do.	Bingzhou Weiqiao Aluminum Co.	Shandong, Zouping	250
Do.	Zouping Aluminum Co. Ltd.	do.	150
Do.	Huaze Aluminum and Power Co. Ltd.	Shanxi, Hejin	400
Do.	New Orient Aluminum Co. Ltd.	Shanxi, Taiyuan	75
Do.	Shanxi Guanlu Aluminum Co. Ltd.	Shanxi, Yuncheng	210
Do.	Yunnan Aluminum Plant	Yunnan, Kunming	500
Antimony	Huaxi (China Tin) Group Industrial Co.	Guangxi, Hechi	25
Do.	Xikuangshan Twinkling Star Co. Ltd.	Hunan, Lengshuijiang	37

See footnotes at end of table.

TABLE 2—Continued  
CHINA: STRUCTURE OF THE MINERAL INDUSTRY IN 2007

(Thousand metric tons unless otherwise specified)

Commodity		Major operating companies <sup>1</sup>	Location of main facilities	Annual capacity <sup>c</sup>
Asbestos		China National Nonmetallic Industry Corp.	Nei Mongol, Baotou; Shanxi, Lai Yuan and Lu Liang	130
Barite		do.	Guizhou, Xiangshou	NA
Bismuth	metric tons	Guangzhou Smelter	Guangdong, Guangzhou	300
Do.	do.	Shizhuyuan Nonferrous Metals Co. Ltd.	Hunan, Shizhuyuan	1,000
Do.	do.	Zhuzhou Smelter (Zhuye Torch Metals Co. Ltd.)	Hunan, Zhuzhou	350
Do.	do.	Yunnan Copper Group Co. Ltd.	Nei Mongol, Chifeng	300
Cadmium		Zhuzhou Smelter (Zhuye Torch Metals Co. Ltd.)	Hunan, Zhuzhou	1
Coal		Hebei Provincial Government	Hebei	70,000
Do.		Heilongjiang Provincial Government	Heilongjiang	100,000
Do.		Henan Provincial Government	Henan	100,000
Do.		Liaoning Provincial Government	Liaoning	70,000
Do.		Nei Mongol Provincial Government	Nei Mongol	90,000
Do.		Shandong Provincial Government	Shandong	60,000
Do.		Shanxi Provincial Government	Shanxi	400,000
Do.		Sichuan Provincial Government	Sichuan	80,000
Do.		Shenhua Coal Corp.	Ningxia, Nei Mongol, and Shaan	150,000
Cobalt	metric tons	Jinchuan Nonferrous Metals Corp.	Gansu, Jinchang	1,200
Copper, refined		Jinchang Smelter (Tongling Nonferrous Metals Group Holding Co. Ltd.)	Anhui, Tongling	170
Do.		Jinlong Smelter (Tongling Nonferrous Metals Group Holding Co. Ltd.)	do.	400
Do.		Wuhu Smelter (Hengxin Copper Industry Group Co.)	Anhui, Wuhu	60
Do.		Baiyin Nonferrous Metals Co.	Gansu, Baiyin	50
Do.		Jinchuan Nonferrous Metals Corp.	Gansu, Jinchuan	200
Do.		Luoyang Copper Processing Factory	Henan, Luoyang	50
Do.		Daye Nonferrous Metals Co.	Hubei, Daye	200
Do.		Zhangjiagang United Copper Co. (Tongling Nonferrous Metals Group Holding Co. Ltd.)	Jiangsu, Zhangjiagang	200
Do.		Guixi Smelter (Jiangxi Copper Co. Ltd.)	Jiangxi, Guixi	700
Do.		Dongfang Copper Co. (Huludao Nonferrous Metals Group)	Liaoning, Huludao	100
Do.		Chifeng Jingeng Copper Co. Ltd.	Nei Mongol, Chifeng, Harqin Banner	100
Do.		Dongying Fangyuan Nonferrous Metals Co. Ltd.	Shandong, Dongying	200
Do.		Shandong Jinsheng Nonferrous Metals Corp.	Shandong, Linyi	100
Do.		Shandong Yanggu Xiangguang Co. Ltd.	Shandong, Yanggu	400
Do.		Yantai Penghui Copper Industry Co. Ltd.	Shandong, Yantai	200
Do.		Taiyuan Copper Industry Co.	Shanxi, Taiyuan	30
Do.		Zhongtiaoshan Nonferrous Metals Co.	Shanxi, Yuangu	100
Do.		Tianjin Datong Copper Co. Ltd. (formerly Tianjin Copper Electrolysis Factory)	Tianjin	200
Do.		Yunnan Smelter (Yunnan Copper Group Co. Ltd.)	Yunnan, Kunming	250
Gallium	metric tons	Shandong Aluminum Plant	Shandong, Zibo	10
Gas, natural	billion cubic meters	China National Petroleum Corp.	Sichuan	10
Germanium	metric tons	Shaoguan Smelter (Shenzhen Nonfermet Co.)	Guangdong, Shaoguan	30
Do.	do.	Nanjing Germanium Co. Ltd.	Jiangsu, Nanjing	30
Do.	do.	Nei Mongol Xilingol Tongtai Germanium Refine Co. Ltd.	Nei Mongol, Xilinhot	20
Do.	do.	Shanghai Lontai Copper Co. Ltd.	Shanghai	10
Do.	do.	Lincang Xinyuan Germanium Co. Ltd.	Yunnan, Lincang	30
Do.	do.	Yunnan Chihong Zinc and Germanium Co. Ltd.	Yunnan, Qujing	10

See footnotes at end of table.

TABLE 2—Continued  
CHINA: STRUCTURE OF THE MINERAL INDUSTRY IN 2007

(Thousand metric tons unless otherwise specified)

Commodity		Major operating companies <sup>1</sup>	Location of main facilities	Annual capacity <sup>c</sup>
Gold, refined	metric tons	China National Gold Corp.	Henan, Lingbao	10
Do.	do.	Zhongyan Gold Smelter (Zhongjin Gold Co. Ltd.)	Henan, Sanmenxia	30
Do.	do.	Jiangxi Copper Co. Ltd.	Jiangxi, Guixi	18
Do.	do.	Laizhou Gold Co.	Shandong, Laizhou	15
Do.	do.	Shandong Yanggu Xiangguang Co. Ltd.	Shandong, Yanggu	20
Do.	do.	Yantai Penghui Copper Industry Co. Ltd.	Shandong, Yantai	5
Do.	do.	Zhaoyuan Gold Co.	Shandong, Zhaoyuan	15
Do.	do.	Great Wall Gold Silver Refinery	Sichuan, Chengdu	100
Graphite		Jixi Aoyu Graphite Co. Ltd.	Heilongjiang, Jixi and Luo	60
Do.		Nei Mongol Xinghe Jingxin Graphite Co. Ltd.	Nei Mongol, Xinghe	10
Indium	metric tons	Laibin Smelter [Liuzhou Huaxi (China Tin) Group Co.]	Guangxi, Laibin	100
Do.	do.	Liuzhou Zinc Products Co.	Guangxi, Liuzhou	20
Do.	do.	Yuguang Gold-Lead Co. Ltd.	Henan, Jiyuan	10
Do.	do.	Zhuzhou Smelter	Hunan, Zhuzhou	60
Do.	do.	Huludao Nonferrous Metals Group Co.	Liaoning, Huludao	30
Do.	do.	Yunnan Mengzi Mining and Smelting Co. Ltd.	Yunnan, Honghe	50
<b>Iron and steel:</b>				
Iron ore		Ma'anshan Iron and Steel Co.	Anhui, Maanshan	10,000
Do.		Shoudu (Capital) Mining Co.	Beijing	20,000
Do.		Meishan Metallurgical Co.	Shanghai	2,000
Do.		Jiuquan Iron and Steel Co.	Gansu, Jiayuguan	4,000
Do.		Hainan Iron Mine	Hainan, Changjiang	4,600
Do.		Handan Xingtai Metallurgical Bureau	Hebei, Handan	3,800
Do.		Tangshan Iron and Steel Co.	Hebei, Tangshan	3,000
Do.		Wuhan Iron and Steel (Group) Co. (Wugang)	Hubei, Wuhan	5,100
Do.		Banshigou Iron Mine Mining Co.	Jilin, Hunjiang	1,400
Do.		Anshan Mining Co.	Liaoning, Anshan	30,000
Do.		Benxi Iron and Steel Co.	Liaoning, Benxi	13,700
Do.		Baotou Iron and Steel and Rare Earth Co.	Nei Mongol, Baotou	10,000
Do.		Taiyuan Iron and Steel Co.	Shanxi, Taiyuan	4,000
Do.		Dabaoshan Mining Co.	Guangdong, Qujiang	1,670
Do.		Panzhihua Mining Co.	Sichuan, Panzhihua	13,000
Do.		Kunming Iron and Steel Co.	Yunnan, Kunming	1,400
Ferroalloys		Shoudu (Capital) Iron and Steel (Group) Co.	Beijing	35
Do.		Northwest Ferroalloy Co.	Gansu, Yongdeng	60
Do.		Zunyi Ferroalloy Co.	Guizhou, Zunhi	100
Do.		Jilin Ferroalloy Co.	Jilin, Jilin	250
Do.		Jinzhou Ferroalloy Co.	Liaoning, Jinzhou	90
Do.		Liaoyang Ferroalloy Co.	Liaoning, Liaoyang	70
Do.		Shanghai Iron and Steel Co. Ltd.	Shanghai	180
Do.		Emei Ferroalloy Co.	Sichuan, Emei	70
Do.		Hengshan Ferroalloy Co.	Zhejiang, Jiande	70
Crude steel		Ma'anshan Iron and Steel Co.	Anhui, Maanshan	10,000
Do.		Shoudu (Capital) Iron and Steel (Group) Co. (Shougang)	Beijing	4,000
Do.		Liuzhou Iron and Steel Group	Guangxi, Liuzhou	6,000
Do.		Handan Iron and Steel General Work (Handan)	Hebei, Handan	10,000
Do.		Shougang Qianan Iron and Steel Co. Ltd. [Shougang]	Hebei, Qianan	4,500
Do.		Tangshan Iron and Steel Co. (Taigang)	Hebei, Tangshan	12,000
Do.		Wuhan Iron and Steel (Group) Co. (Wugang)	Hubei, Wuhan	12,000
Do.		Shagang Group Co. Ltd.	Jiangsu, Zhangjiagang	15,000
Do.		Anshan Iron and Steel (Group) Co. (Angang)	Liaoning, Anshan	16,000
Do.		Benxi Iron and Steel Co. (Bengang)	Liaoning, Benxi	6,000

See footnotes at end of table.

TABLE 2—Continued  
CHINA: STRUCTURE OF THE MINERAL INDUSTRY IN 2007

(Thousand metric tons unless otherwise specified)

Commodity	Major operating companies <sup>1</sup>	Location of main facilities	Annual capacity <sup>c</sup>
Iron and steel—Continued:			
Crude steel—Continued	Baotou Iron and Steel and Rare Earth Co. (Baogang Group)	Nei Mongol, Baotou	10,000
Do.	Baoshan Iron and Steel (Group) Corp. (Baosteel) [Baogang Group]	Shanghai	19,000
Do.	Shanghai Iron and Steel Co. Ltd.	do.	6,000
Do.	Shandong Jinan Iron and Steel Group Co.	Shandong, Jinan	10,000
Do.	Shandong Laiwu Iron and Steel Group Co.	Shandong, Laiwu	10,000
Do.	Taiyuan Iron and Steel Co. (Taigang)	Shanxi, Taiyuan	5,000
Do.	Panzhuhua Iron and Steel (Group) Co. (Pangang)	Sichuan, Panzhihua	6,000
Lead	Jiuhua Smelter (Tongling Nonferrous Metals Group Holding Co. Ltd. Chizhou Co.)	Anhui, Chizhou	80
Do.	Baiyin Nonferrous Metals Co. Ltd.	Gansu, Baiyin	80
Do.	Shaoguan Smelter (Shenzhen Nonfermet Co.)	Guangdong, Shaoguan	100
Do.	Laibin Smelter [Huaxi (China Tin) Group Co.]	Guangxi, Laibin	100
Do.	Hechi South Nonferrous Metals Smelting Co. Ltd.	Guangxi, Hechi	60
Do.	Anyang Smelter (Yubei Metal Co.)	Henan, Anyang	160
Do.	Jiyuan Wangyang Nonferrous Smelter	Henan, Jiaozuo	100
Do.	Jiyuan Smelter (Yuguang Gold-Lead Co. Ltd.)	Henan, Jiyuan	300
Do.	Henan Lingye Co. Ltd.	Henan, Lingbao	100
Do.	Hanjiang Smelter	Hubei, Luhekou	50
Do.	Shuikoushan Nonferrous Metals Co. Ltd.	Hunan, Hengyang	100
Do.	Zhuzhou Smelter (Zhuye Torch Metals Co. Ltd.)	Hunan, Zhuzhou	100
Do.	Xuzhou Chunxing Alloy Co. Ltd.	Jiangsu, Xuzhou	150
Do.	Jiangxi Jinde Lead Co. Ltd.	Jiangxi, Shangrao	80
Do.	Huludao Nonferrous Metals Group Co. Ltd.	Liaoning, Huludao	30
Do.	Kunming Smelter	Yunnan, Kunming	100
Do.	Yunnan Chihong Zinc and Germanium Co. Ltd.	Yunnan, Qijiang	100
Lithium, LiCO <sub>3</sub>	Sichuan Shehong Lithium Co. Ltd.	Sichuan, Shehong	2
Do.	Qinghai Yanhu Industry Group Co. Ltd.	Qinghai, Golmud	10
Do.	Xinjiang Lithium Co.	Xinjiang, Urumqi	5
Magnesium	Zunyi Titanium Co. Ltd.	Guizhou, Zunyi	24
Do.	Ningxia Huayuan Magnesium Group	Ningxia, Yinchuan	15
Do.	Huayu Interprises (Group) Ltd.	Shanxi, Jishan	35
Do.	Taiyuan Tongxiang Magnesium Metal Co. Ltd.	Shanxi, Taiyuan	45
Do.	Taiyuan Yiwei Magnesium Co. Ltd.	do.	21
Do.	Wenxi Biyun Magnesium Co. Ltd.	Shanxi, Wenxi	30
Do.	Wenxi Yinguang Magnesium Group	do.	40
Manganese, metal	Chongqing Tycoon Manganese Co. Ltd.	Chongqing	23
Do.	Guangxi Dameng Manganese Industry Co. Ltd.	Guangxi, Nanning	70
Molybdenum, concentrate	Luoyang Luanchuan Molybdenum Industry Group Co., Ltd.	Henan, Luanchuan	30
Do.	Jinduicheng Molybdenum Industry Group Co. Ltd.	Shaanxi, Huaxian	30
Nickel, refined	Jinchuan Nonferrous Metals Corp.	Gansu, Jinchuan	100
Do.	Jilin Jien Nickel Industry Co. Ltd.	Jilin, Panshi	10
Do.	Chengdu Electro-Metallurgy Factory	Sichuan, Chengdu	5
Do.	Xinjiang Fukang Smelter	Xinjiang, Fukang	15
Do.	Yuanjiang Nickel Industry Co. Ltd.	Yunnan, Yuxi	5
Petroleum, crude	Shengli Bureau	Hebei, Shengli	33,500
Do.	Daqing Bureau	Heilongjiang, Daqing	55,000
Do.	Liaohe Bureau	Liaoning, Liaohe	15,000
Do.	Bohai Offshore Oil Corp.	Bohai	4,000
Do.	Nanghai East Corp.	Nanghai	5,000
Potash	Qinghai Yanhu Industry Group Co. Ltd.	Qinghai, Charhan	2,000

See footnotes at end of table.

TABLE 2—Continued  
CHINA: STRUCTURE OF THE MINERAL INDUSTRY IN 2007

(Thousand metric tons unless otherwise specified)

Commodity	Major operating companies <sup>1</sup>	Location of main facilities	Annual capacity <sup>e</sup>	
Rare earths	Gansu Rare Earths Co.	Gansu, Baiyin	32	
Do.	Jiangxi Rare Earths Co.	Jiangxi, Nanchang	1	
Do.	Zhujiang Smelter	Guangdong, Guangzhou	5	
Do.	Baotou Iron and Steel and Rare Earths Corp. (Baogang Group)	Nei Mongol, Baotou	55	
Do.	Shanghai Yaolong Nonferrous Metals Co.	Shanghai	2	
Salt	Shandong Haihua Group Co. Ltd.	Shandong, Weifang	1,400	
Do.	Zigong Zhangjiaba Salt Chemical Plant	Sichuan, Zigong	250	
Silver	metric tons	Laibin Smelter [Huaxi (China Tin) Group Co.]	Guangxi, Laibin	80
Do.	do.	Daye Nonferrous Metals Co.	Hubei, Daye	100
Do.	do.	Jiangxi Copper Co. Ltd.	Jiangxi, Guixi	415
Do.	do.	Huludao Nonferrous Metals Group Co. Ltd.	Liaoning, Huludao	80
Do.	do.	Yantai Penghui Copper Industry Co. Ltd.	Shandong, Yantai	80
Do.	do.	Great Wall Gold Silver Refinery	Sichuan, Chengdu	300
Do.	do.	Yunnan Smelter (Yunnan Copper Group Co. Ltd.)	Yunnan, Kunming	450
Strontium, carbonate	Chongqing Chonglong Strontium Co. Ltd.	Chongqing	20	
Do.	Chongqing Tongliang Redbutterfly Strontium Co.	do.	120	
Do.	Hebei Xinji Chemical Group	Hebei, Xinji	130	
Do.	Nanjing Jinyan Strontium Co. Ltd.	Jiangsu, Lishui	20	
Talc	China National Nonmetallic Industry Corp.	Guangxi, Longshen	130	
Do.	do.	Liaoning, Haicheng	50	
Do.	do.	Shandong, Qixia	5	
Tin, smelter	Laibin Smelter [Huaxi (China Tin) Group Co.]	Guangxi, Laibin	25	
Do.	Pinggui Mining Bureau	Guangxi, Zhongshan	8	
Do.	Yunnan Tin Industry Co.	Yunnan, Gejiu	55	
Titanium, sponge	Guizhou Southwest Titanium Co. Ltd.	Guizhou, Guiyang	3	
Do.	Zunyi Titanium Co. Ltd.	Guizhou, Zunyi	14	
Do.	Luoyang Sun Rui Wanji Titanium Industry Co. Ltd.	Henan, Xinan	10	
Do.	Chaoyang Baisheng Zirconium Co. Ltd.	Liaoning, Chaoyang	8	
Do.	Chaoyang Jintai Titanium Co. Ltd.	do.	3	
Do.	Fushun Titanium Co. Ltd.	Liaoning, Fushun	5	
Do.	Jinzhou Huashen Nonferrous Metals Plant	Liaoning, Jinzhou	4	
Tungsten, concentrate	Ninghua Hangluoken Tungsten Mine (Amoi Tungsten Co. Ltd.)	Fujian, Ninghua	4	
Do.	Shizhuyuan Nonferrous Metals Co.	Hunan, Chenzhou	5	
Do.	Yaogangxian Tungsten Mine	Hunan, Yizhang	3	
Do.	Jiangxi Tungsten and Rare Earth Co. Ltd.	Jiangxi, Gangzhou	15	
Zinc	Northwest China Lead-Zinc Smelter (Baiyin Nonferrous Metals Co. Ltd.)	Gansu, Baiyin	150	
Do.	Shaoguan Smelter (Shenzhen Nonfemet Co.)	Guangdong, Shaoguan	170	
Do.	Liuzhou Zinc Products Factory	Guangxi, Liuzhou	100	
Do.	Yugang Gold-Lead Co. Ltd.	Henan, Jiyuan	250	
Do.	Shuikoushan Nonferrous Metals Co. Ltd.	Hunan, Hengyan	60	
Do.	Zhuzhou Smelter (Zhuye Torch Metals Co. Ltd.)	Hunan, Zhuzhou	500	
Do.	Huludao Zinc Smelting Co. (Huludao Nonferrous Metals Group. Co. Ltd.)	Liaoning, Huludao	390	
Do.	Zijin Bayannur Co. Ltd.	Nei Mongol, Bayannar League	220	
Do.	Dongling Zinc Industry Co. Ltd. (Dongling Group)	Shaanxi, Baoji	100	
Do.	Laibin Smelter	Yunnan, Laibin	60	
Do.	Yunnan Jinding Zinc Co. Ltd. (Sichuan Hongda Group)	Yunnan, Lanping	100	
Do.	Yunnan Chihong Zinc and Germanium Co. Ltd.	Yunnan, Qijiang	160	

<sup>e</sup>Estimated; estimated data are rounded to no more than three significant digits. Do., do. Ditto. NA Not available.

<sup>1</sup>Companies are owned by either the central Government or a Provincial government.

TABLE 3  
CHINA: EXPORTS OF SELECTED MINERAL COMMODITIES IN 2007

	Quantity (metric tons)	Value (thousands)
<b>METALS</b>		
<b>Aluminum:</b>		
Alumina	31,893	\$18,781
<b>Metal and alloys:</b>		
Unwrought	545,586	1,337,986
Semimanufactures	1,853,413	5,932,757
Antimony metal, unwrought	8,230	39,578
Barium sulfate	3,110,000	135,101
<b>Copper, metal and alloys:</b>		
Unwrought	126,578	856,203
Semimanufactures	499,678	3,799,812
<b>Iron and steel:</b>		
Ferrosilicon	1,540,000	1,298,726
Pig iron and cast iron	690,000	254,721
<b>Steel:</b>		
Bars and rods	16,250,000	8,286,759
Shapes and sections	5,600,000	3,009,219
Sheets and plates	28,320,000	20,230,020
Tube and pipe	1,420,000	2,472,884
Magnesium metal, unwrought	207,649	500,888
Manganese, unwrought	281,875	770,032
Tin, metal and alloys, unwrought	23,582	315,931
Tungsten, tungstates	5,526	120,514
<b>Zinc:</b>		
Metal and alloys, unwrought	276,714	1,055,664
Oxide and peroxide	54,425	140,873
<b>INDUSTRIAL MINERALS</b>		
Cement	33,010,000	1,150,433
Fluorspar	540,000	101,568
Granite	1,260,000	192,019
Graphite, natural	670,550	103,226
Magnesia, fused	2,270,000	335,326
Talc	660,000	93,541
<b>MINERAL FUELS AND RELATED MATERIALS</b>		
Coal	53,170,000	3,295,498
Coke, semicoke	1,530,000	3,053,963
<b>Petroleum:</b>		
Crude oil	3,890,000	1,687,098
Refinery products	15,510,000	9,149,553

Source: General Administration of Customs of the People's Republic of China, 2007, China monthly exports and imports, no. 12.

TABLE 4  
CHINA: IMPORTS OF SELECTED MINERAL COMMODITIES IN 2007

(Metric tons unless otherwise specified)

	Quantity	Value (thousands)
<b>METALS</b>		
<b>Aluminum:</b>		
Alumina	5,120,000	\$1,973,987
Metal and alloys, unwrought	282,135	629,931
Semimanufactures	689,944	3,184,735
Scrap	2,090,610	2,446,274
Chromium, chromite	6,090,000	1,549,656
Cobalt, ore and concentrates	118,144	382,601
<b>Copper:</b>		
Ore and concentrates	4,520,000	8,816,441
Anode	129,244	463,056
Metal and alloys, unwrought	1,726,199	11,929,129
Semimanufactures	1,053,809	7,738,033
Scrap	5,584,687	6,390,601
<b>Iron and steel:</b>		
Iron ore	383,090,000	33,795,570
<b>Steel:</b>		
Bars and rods	1,060,000	1,263,860
Scrap	3,390,000	2,496,578
Seamless pipe	770,000	2,947,602
Shapes and sections	330,000	270,165
Sheets and plates	14,290,000	14,964,655
Manganese ore	6,630,000	1,302,356
<b>Nickel:</b>		
Ore and concentrates	15,563,947	2,411,244
Metal	103,855	3,818,261
Titanium dioxide	276,329	546,422
<b>INDUSTRIAL MINERALS</b>		
Diamond	kilograms 3,665	2,850,360
<b>Fertilizers:</b>		
Compound fertilizers	1,350,000	385,283
Diammonium phosphate	540,000	149,970
Potassium chloride	9,410,000	2,287,243
Potassium sulfate	180,000	46,556
Urea	542	270
Sodium carbonate	39,684	6,953
<b>MINERAL FUELS AND RELATED MATERIALS</b>		
Coal	51,020,000	2,421,605
<b>Petroleum:</b>		
Crude oil	163,170,000	79,770,911
Refinery products	33,800,000	16,436,753

Source: General Administration of Customs of the People's Republic of China, 2007, China monthly exports and imports, no. 12.



TABLE 5  
IRON ORE AND PELLETS CONTRACT PRICES IN ASIA AND EUROPE

[U.S. cents per 1% iron content (dry metric ton)]

	Asia			Europe		
	2006	2007	2008	2006	2007	2008
BHP Newman fine	73.45	80.43	144.66	NA	NA	NA
BHP Newman lump	93.74	102.65	210.69	NA	NA	NA
CVRD Blast Furnace pellet	108.68	114.42	213.59	112.05	117.96	220.20
CVRD Carajas fine	66.85	73.20	125.17	77.35	81.46	140.60
CVRD South System fine	65.85	72.11	118.98	74.39	84.67	134.41
CVRD Tubarao lump	86.14	94.32	155.64	NA	NA	NA
IOC pellet	115.86	121.98	227.70	NA	NA	NA
MAC fine	73.45	80.42	144.66	NA	NA	NA
MAC lump	93.74	102.63	210.69	NA	NA	NA
Rio Tinto PB fine	73.45	80.42	144.66	NA	NA	NA
Rio Tinto PB lump	93.74	102.64	201.69	NA	NA	NA
Rio Tinto Robe River fine	58.55	64.11	115.32	NA	NA	NA
Rio Tinto Robe River lump	74.61	81.70	160.54	NA	NA	NA
Rio Tinto Yandi fine	73.45	80.42	144.66	NA	NA	NA

NA Not available.