

Soda Ash

Dennis S. Kostick, the U.S. Geological Survey mineral commodity specialist for soda ash, sodium sulfate and salt, has compiled the following information about soda ash, an essential raw material in glass, chemicals and detergents.

Soda ash, also known as sodium carbonate, is an alkali chemical that can be refined from the mineral trona and from sodium carbonate-bearing brines. Several chemical processes exist for manufacturing synthetic soda ash.

Although soda ash represented 2 percent of the total estimated \$52 billion U.S. nonfuel minerals industry in 2005, its use in many products contributes substantially to the gross domestic product of the United States. The domestic automotive and construction industries use soda ash to make flat glass and fiber glass. Because of its industrial importance, the U.S. Geological Survey canvasses soda ash production statistics for use in the monthly economic indicators for the Federal Reserve Board's industrial production index, which measures the condition of the U.S. economy.

Sodium carbonate commonly occurs as precipitates in shallow, nonmarine alkaline lakes and marshes, and usually coexists with various chloride and sulfate salts. For this reason, it is not uncommon to find several sodium carbonate-bearing minerals within the same deposit. Because of its deposition in shallow bodies of water, in which seasonal changes, as well as mechanical and chemical erosion, make the minerals susceptible to destruction, large economic sodium carbonate deposits are relatively rare.

World soda ash production for 2005 was an estimated 42 million metric tons, with China, India, Poland, Russia and the United States accounting for 73 percent of the total. Of the 29 countries that produce natural and synthetic soda ash, the United States is the world's second leading producer, accounting for 26 percent of total world output.

Only Botswana, China, Kenya and the United States produce soda ash from natural sources, which account for 28 percent of combined world soda ash production. The remainder is synthetic soda ash manufactured through various chemical processes, primarily the Solvay process, which is an ammonia-soda process that uses limestone and salt as the main raw materials.

Soda ash is a mature commodity that tends to grow parallel to population and gross domestic product. U.S. reported consumption in 2005 was estimated at 6.5 million metric tons, which was an increase over the prior year. Domestic soda ash consumption has been relatively flat for several years, with domestic markets growing only about 1 percent annually. The United States has the world's largest deposit of buried trona — enough to sustain the domestic demand for soda ash for centuries.

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Sample of trona, the primary source of soda ash. Image from *Minerals in Your World*.