

Lithium

Joyce A. Ober, the lithium commodity specialist at the U.S. Geological Survey, has prepared the following information on lithium, an important component in many batteries.

Lithium, the lightest metallic element, is silvery, white and soft, and highly reactive. It is used most frequently in chemical compounds or traded as mineral concentrates. Its thermal properties make it an ideal component in thermal shock-resistant ceramics, and its electrochemical properties make it an ideal material for several types of batteries.

Lithium consumption is often cited in “tons of lithium carbonate equivalent” because lithium carbonate is commonly used in many industries and is the precursor for all other lithium chemicals. In 2005, world lithium consumption was the equivalent of nearly 80,000 metric tons of lithium carbonate.

Chile has been the world’s leading producer of lithium carbonate since 1997, when it surpassed the United States in production. Most commercial lithium carbonate production in the world is from brine deposits because of the significantly lower cost of production combined with the abundance of lithium in brines. China is the only major lithium carbonate producer that mines hard-rock lithium mineral deposits for feedstock. Australia is, by far, the leading producer of lithium concentrates, but Brazil, Canada, Portugal and Zimbabwe also produce significant quantities.

Major uses for lithium chemicals include air conditioning, batteries, ceramics and glass, lubricating greases, pharmaceuticals and polymers, and primary aluminum production. Although the use of lithium in batteries has been viewed as a potential growth area for several decades, batteries had been only a minor end-use for lithium until recently.

Rechargeable lithium batteries, however, have become quite popular for electronic equipment, such as portable telephones, portable computers and video cameras. This popularity is because of the batteries’ even discharge over time and their low tendency to self-discharge resulting in long shelf-lives. Portable heavy-duty tools with rechargeable lithium batteries were introduced during the past year, and recent developments in hybrid-electric vehicles offer the potential for additional growth in rechargeable lithium battery demand, if lithium-ion batteries become the preferred battery type for this application. Non-rechargeable lithium batteries are used in cameras, electronic games, microcomputers, small appliances, toys and watches.

Although traditional markets are still important to the lithium industry, batteries are the growth leader, increasing by more than 20 percent per year in the past few years, and lithium-ion and lithium-polymer batteries appear to have the greatest potential for additional growth. Batteries may soon become the leading end use for lithium.

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Lithium pellets with penny for scale. Image from *Minerals in Your World*.