KYANITE

The manufacture of mullite-type refractories accounts for most of the kyanite consumed, but nonrefractory uses are expanding. The production of synthetic mullite from aluminous and siliceous materials has substantially increased in recent years. Technologic changes in metallurgical practices have tended to increase demands for the more efficient and high-performance advantages that mullite has over lower cost refractory materials. End use applications favor the employment of kyanite-based refractories for special uses. The sources of domestic supply are remote from the growing market centers which occasions high transportation costs and the search for more diversified sources of appropriate quality.

Recovery of kyanite from its ores, at grades that are commercially acceptable, is relatively inefficient.

More diversified uses for kyanite that would tend to divorce demand from complete dependence on the refractory market would, in turn, encourage the development of more diversified sources of supply.

LEAD

Spot shortages and long-term surpluses characterize the past and foreseeable future supply-demand relationship for lead. New world productive capacity and secondary output infer an atmosphere of surpluses and downward pressure on prices. Moreover, technological advancement has tended to curtail the growth in lead demand. The industry would welcome new large-volume applications for lead.

Lead production affects, and is in turn affected by, the demand for and the economic aspects of a variety of coproducts and byproducts. The relationship between zinc and lead is particularly significant.

Major changes in the demand pattern are possible, particularly in the largest end-use applications, storage batteries, and gasoline antiknock compounds. The latter is seen as a possible environmental problem.

Because of the local employment and tax revenue significance of lead extraction, production and use, Governmental action has frequently sought to protect the domestic elements of the industry through quotas and other devices. The factors that infer downward pressures on price, and dictate the capacity of the domestic industry to compete on the world market, will continue to attract legislative attention.

Lead (and zinc) is largely produced from deep sources. Technological advances in subsurface excavation, ground control and recovery, work to the advantage of the domestic competitive position. Similarly, more sophistication in exploration techniques will insure maintenance of a favorable domestic reserve position.

Transportation costs of bulk ore and concentrates to established mills or smelters are a limiting factor in exploitation of small lead deposits. To be commercially significant, such deposits would require development of a successful "mini-technology" for processing at the mine site.

LITHIUM

Domestic resources are in the form of mineral inclusions in pegmatites and as salts in certain brines. The former are large and the latter might be even larger. But both are commercially significant only when considered in terms of the coproduct values. World potential is unknown but considered large. Processing of brines tends to be a complex chemical problem and requires technologic improvement.

Both as a metal and in the compound form lithium is finding increased applications in the most advanced enterprises of technology. Price alone restrains a greatly increased consumption of the metal and infers a need for process improvement.

MAGNESIUM

Magnesium is the third most abundant structural element in the earth's crust and is extracted commercially from such universal sources as sea water, well brines, and dolomite. It should find increasing commercial application as a metal and a variety of compounds. Because of the virtually unlimited nature of the presently commercial sources the advantages of substitution for less abundant commodities seem only partially realized. In structural application, for example,