

Lithium remains to be one of the most important metals in the manufacturing of rechargeable batteries amongst other uses. Despite recent price fluctuations, the vast expansion in the everyday use of such batteries is driving the current rush in lithium mining worldwide. Lithium is mined from mainly two types of deposits; from hard rock pegmatites and from its brine resources in the arid regions of the world. Advantages of pegmatite deposits have been the main reason for the current focus of mining activities globally. Although there are several brine resources containing lithium in the world, only limited ones offer commercially viable processing options. Generally, brines require less energy, but lengthy, time-consuming recoveries as compared to hard rock deposits that use traditional mineral processing methods with high energy, but much faster concentrate production.

Valuable lithium-containing pegmatite rock can be found in abundance in Australia and North America, and significant occurrences of lepidolite and petalite mainly in China and Zimbabwe. The most common lithium bearing minerals in pegmatite deposits are spodumene as the most desirable one with the highest lithium content (theoretically 8% LiO₂) and lepidolite and petalite with lower lithium contents. These three lithium minerals are generally concentrated by gravity, magnetic and most importantly by froth flotation methods.

This presentation will discuss:

- a. Froth flotation methods of spodumene used in Australia and North America along with lepidolite and petalite applications in China
- b. The value, performance characteristics of deposit-specific, custom-formulated collectors in comparison to commodity fatty acid collectors widely used in spodumene flotation applications
- c. Case studies supporting the benefits of formulated collectors for improved performance