

# SEG 100 Conference: Celebrating a Century of Discovery

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**ST.066**

## **Cesium Deposits**

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Cesium (Cs) is a little-known element, the bulk of which is used in oil and gas well servicing in the form of cesium formate, but it also has diverse uses in high tech specialty applications. Historically, cesium has been won from the minerals pollucite and lepidolite from “giant” pegmatites like Tanco in Manitoba and Bikita in Zimbabwe, or the Yichun granite, PRC. These sources are now problematic, production having been stopped at Tanco by a fall of loose rock and at Bikita by exhaustion of stockpiles. The small Sinclair deposit in Australia was mined out in 2019 and the ore shipped to China. Several small cesium deposits have been identified in Australia, Africa, the U.S., and Canada, but none have reached systematic production. A second type of cesium is found in the form of epithermal geyserites which have been identified in Tibet, India, and Argentina. Although of lower Cs grades and widely varying mineral assemblages, these may be equal in their contained cesium to the large pegmatite sources. In turn, their differing mineralogy may lend to more easily processible and less costly metallurgy. The Taron deposit (Argentina) is a recently discovered cesium-bearing geyserite. A third type of cesium deposit is formed through greisenization. The Yichun rare metal granite is an example of Li-Cs endogreisenization formed in situ and at the expense of its protolith. In Yellowstone National Park in Wyoming, Li-Cs exogreisenization is currently occurring, and mineral Li-Cs assemblages are forming at very low temperatures and pressures in sedimentary rocks. The source of Cs-bearing pegmatites is probably that of fractionation of S-type granites, and the source of Cs-bearing geyserites is probably similar to that at Yellowstone in which large volumes of rhyolites over the Yellowstone mantle plume are being leached by circulating epithermal fluids. Cesium is now on the U.S. Government’s critical elements list, and there is burgeoning exploration for Cs-bearing pegmatites. At present, Albemarle Corp., in China, and the China’s Sinomine Resource Group control the cesium industry. This study was undertaken to characterize the importance of geology, geochemistry, mineralogy, and geometallurgy of these types of cesium deposits and to offer some insight as to the origins of novel deposits.