

Orebody Knowledge from the Sinclair Deposit: A New Template for Cesium Exploration

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Globally significant discoveries of Cesium-rich pollucite deposits are exceptionally rare, with only three commercial operations reported to date: Bikita (Zimbabwe), Bernic Lake (Canada), and Sinclair (Western Australia). Pollucite mineralisation forms exclusively within extremely differentiated lithium–Cesium–tantalum (LCT) pegmatites, making Cesium deposits challenging to explore for, and highly sensitive to the specific conditions of pegmatite emplacement and fractionation.

Despite a surge in global exploration for LCT pegmatites during the Lithium Demand Rally (2015–2025), driven by renewable energy and electric vehicle markets, only one new pollucite mine (Sinclair, discovered in 2016) and one new resource (West Joe, Ontario, release in 2025) were added to the global Cesium inventory. Additional encouraging drill intercepts were reported from two other Canadian properties and one Angolan project, highlighting the extreme rarity of economic pollucite mineralization even under intense exploration focus.

The discovery and development of the Sinclair Cesium Mine has provided a rare and invaluable opportunity to investigate the geological and geochemical controls on high-grade Cesium mineralization. Detailed study of the Sinclair orebody has improved understanding of LCT pegmatite evolution at the extreme end of fractionation, providing new insights into the timing, setting, and mineralogical signatures critical for pollucite development and Cesium enrichment.

This new orebody knowledge offers a robust template for future exploration targeting Cesium-rich pegmatites. Furthermore, it assists in the re-evaluation of historical LCT pegmatite fields, including the interpretation of emerging discoveries such as West Joe. The Sinclair model illustrates the importance of detailed deposit studies to guide the identification of rare critical metal resources, supporting future discoveries essential for high-technology and energy transition industries.