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Cesium and Rubidium Supply: Minor Metals in the Shadow of an Emerging Giant

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The recent global initiatives to increase energy efficiency combined with concerns of risks to critical mineral supply security have reshaped the mineral market landscape. Lithium (Li) is one of the commodities at the forefront of this shift, where an imbalance in projected supply and demand has led to major exploration efforts and Li resource discoveries. Importantly, other metals with smaller, specialized markets have also benefited from this exploration, namely cesium (Cs) and rubidium (Rb). Prior to the “Li boom”, market and government reports suggested that much of the readily available Cs supply, mined as pollucite from Li-mineralized pegmatites, was near exhaustion. Similarly, Rb is only sourced as a byproduct from Cs and Li mining, indicating a near term supply risk. Nonetheless, the lack of publicly available Rb and Cs market data and supply statistics have hindered the assessment of the supply of these commodities.

This study provides a modern snapshot of global Rb and Cs supply. Through an up-to-date compilation of global Cs and Rb resources, the recent Li exploration activities of hardrock deposits (i.e., pegmatite, granite-greisen) are shown to contain relatively plentiful in situ resources. Trends in Cs and Rb refinery output over the past two decades demonstrate that production capacities have only increased through the construction of Li refineries, specifically those with lepidolite processing facilities. However, mine production significantly decreased over the same period, highlighting a supply bottleneck at the mine stage of the supply chains for these metals. Without the permitting and mine development of newly discovered deposits, global Cs and Rb supply will continue to decrease. Moreover, this research emphasizes the role of major metal exploration and market growth in the supply security of minor co-dependently produced commodities.