

**Title: Mining the Science of the Nation's Premier Rare Earth Element Deposit at Mountain Pass, CA**

Abstract: For over fifty years, the Mountain Pass rare earth element deposit has been at the forefront of technological revolutions. From color television sets to cell phones, to permanent magnets, rare earth elements (lanthanides) have filled essential applications that cannot be replicated by other parts of the periodic table. Given their importance to the Nation's economy and vulnerability to supply disruption, the rare earth elements constitute about a third of the USGS 2022 Final List of Critical Minerals (Federal Register notice 87 FR 10381). USGS science on the Mountain Pass deposit dates back to its discovery in the Mojave Desert in 1949. Economic rare earth element mineralization is hosted in a carbonatite stock associated with a belt of ~1.4 Ga alkaline silicate intrusions in southeastern California. Bastnäsite, a light rare earth element-bearing fluorocarbonate mineral,  $\text{LREE}(\text{CO}_3)\text{F}$ , is the dominant ore mineral. Integrated USGS research on the geology, geophysics, geochronology, petrology, and economic geology of the Mountain Pass deposit is yielding new insights into its formation and geologic context.

**Bio:** Kathryn Watts is a Research Geologist with the U.S. Geological Survey (USGS) in Spokane, WA. Her research is focused on crustal magmatism, from processes that fuel volcanic eruptions to those that contribute to the formation of economically valuable mineral resources. Kathryn's current projects focus on rare earth element (REE) and lithium (Li) mineral resources in the Mojave Desert, CA and Great Basin, NV. She joined the USGS in 2012 as a Mendenhall Postdoctoral Research Fellow, following completion of her Ph.D. at the University of Oregon in 2011. Kathryn's areas of expertise include - igneous petrology, geochemistry, isotope geochemistry, geochronology, volcanology, and economic geology.