

Hyperspectral Core Scanning at the Thacker Pass Lithium Deposit, Northern Nevada: Implications to Mineral Exploration and Resource Definition

Marxa Ajata¹, Miranda Abts¹, Thomas Monecke¹, Friederike Koerting², Randal Burns³

¹CASERM, Colorado School of Mines, Golden, United States, ²Norsk Elektro Optikk AS, HySpex, Oslo, Norway,

³Lithium Americas, Reno, United States

The Thacker Pass lithium deposit, located within the ~16.3 Ma McDermitt Caldera in northern Nevada, represents one of the largest known clay-hosted lithium resources globally, with a measured and indicated resource of 44.5 million metric tonnes of contained lithium carbonate equivalent. Accurate characterization of mineralogical variability in the caldera lake sediments that host the lithium deposit, particularly the clay and ash contents is critical for optimizing lithium recovery and mineral processing. In this study, representative drill core was scanned using a HySpex SWIR-384 hyperspectral imaging system, operating within a spectral range of 930–2,500 nm, to map the spatial distribution of clay minerals and ash-rich intervals in key lithological units. Core scanning was conducted at a high spatial resolution (pixel size of 250 by 250 micrometers) to account for the fine-grained nature of the rocks. Results reveal significant vertical and lateral variability in clay content. Integration of the hyperspectral dataset enhances geological and geometallurgical modeling, supporting improved ore-waste discrimination. These findings demonstrate the technical viability of hyperspectral imaging for real-time ore characterization. Additionally, the high-resolution mineralogical information obtained through non-destructive core scanning provides valuable insight into lithological variability, alteration signatures, and potential metallurgical behavior, supporting fast and cost-effective exploration and resource definition workflows.