☒ **Talk** ☐ **Poster**

Mineralogical Roles of Typical Secondary Minerals in Cerium Adsorption and Oxidation

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Rare earth elements are critical for development of our society, but the low minable abundance in the Earth's crust has brought concerns. Among rare earth elements, cerium is of special interest to geochemists due to its redox sensitive geochemical characteristics and has been used to study oxygen level both at present and in the past. Ion-adsorption type deposits that formed under weathering process are secondary deposits enriched in rare earth elements, and secondary minerals like clay minerals and iron (oxyhydr)oxides are major components of these deposits. Although the general rare earth adsorption behaviors on minerals with surface charging are well studied, the effects of secondary mineral structures and surface sites are poorly constrained. In order to unravel the fundamental controls on cerium environmental fate under weathering conditions, typical clay minerals and iron oxides were utilized to conduct a series of adsorption experiments. X-ray absorption spectroscopy were deployed to elucidate the roles of clay minerals and iron oxides with different mineralogy in cerium oxidation and redistribution during its transport under weathering process. Our results showed that cerium can be oxidized on iron oxides with specific mineralogy and surface structures, and cerium was quantitatively adsorbed by clay minerals and amorphous ferrihydrite. This study detailed molecular mechanisms of Ce enrichment and oxidation in secondary minerals, and will help clarify chemical trends with different mineralogy that affect the fate of critical elements from a systematic perspective.

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