Oral | Symbol S (Solid Earth Sciences) | S-MP Mineralogy & Petrology

[S-MP49_1PM2]Nano-Analyses of Natures and Origins of Earth and Planetary Solids

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Nano, a prefix for 10^-9, represents vast frontiers for both Earth and Planetary Solid Sciences. Conventional tools such as Electron Probe MicroAnalysis (EPMA) for ppm-level quantification at the micrometer scale and Power X-Ray Diffraction analysis (XRD) for the identification of submicron minerals are being transformed into the next generation instruments. In addition, it is possible to reveal the heterogeneity and oscillation of chemical and isotopic compositions at nano-spatial resolutions. It is becoming more aware that nano-sized solids with extremely large surface areas and distorted structures are ubiquitous in planetary materials and intimately relevant to many issues such as soil and groundwater contamination with metals and radionuclides, mineral resources exploitation, carbon sequestration and son on. The aim of this session is to expand our fundamental understanding of, and to share technological advancements in, nano-frontiers from various fields of Earth and Planetary Sciences.

5:30 PM - 5:45 PM

[SMP49-P02_PG]Surface complexation modeling for lead adsorption on nano-sized aluminum silicate

3-min talk in an oral session

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Keywords:nano-sized aluminum silicate, lead, adsorption, surface complexation modeling

There are many abandoned lead-produced mines in Japan. The water pollutions by lead due to the weathering of the mine wastes are environmental concern. The concentrations of lead released from the mine wastes is usually low. Therefore, the adsorption process is expected to dominate the mobility of lead in the affected area. It is well recognized that the materials widely occurred in earth surface conditions are comprised with low-crystalline and/or nano-sized minerals. There are some reports for lead adsorption behavior on crystalline phases such as clay minerals and low-crystalline iron oxides. On the other hand, there are very little reports on nano-sized aluminum silicates which must be dominant phases in surface condition. The quantitative understandings of lead adsorption on nano-sized aluminum silicate is essential for the prediction of lead migration in earth surface conditions. The purpose of the study is to clarify the lead adsorption behavior on nano-sized aluminum silicate under wide range of solution conditions and model the adsorption behavior by means of surface complexation modeling.