Surface complexation modeling for lead adsorption on nano-sized aluminum silicate

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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.

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