Arsenate uptake by monohydrocalcite

Minoru Sakai[1]; Takashi Munemoto[2]; Keisuke Fukushi[3]

[1] earth sciences,kanazawa Univ.; [2] Earth sciences, Kanazawa Univ.; [3] KINET

The contamination of water and soil by arsenic has become a serious environmental problem in many countries around world, e.g. Bangladesh, India, USA (Smedley et al. 2002). Arsenic can occur in the environment in several oxidation states but in natural waters it mostly found in inorganic form as oxyanions of trivalent arsenite or pentavalent arsenate.Under oxidizing conditions, arsenate is predominant species. Arsenate is found to effectively adsorb on Al and Fe oxide surfaces (Fukushi and Sverjensky 2007). Especially, ferrihydrite and shwertmannite, which are metastable with respect to Fe oxide, are more effective adsorbent than the stable phases (Fukushi et al. 2004, Fukushi and Sverjensky 2007). Recently, Alexandratos et al. (2007) indicated that calcite, which is a calcium carbonate mineral, is also an effective adsorbent for arsenate.Monohydrocalcite (CaCO3H2O MHC) has been known as a metastable phase of calcium carbonate minerals. It is known that the MHC formation require a high pH and the high CO2 in the presence of Mg2 ion in mother solution. MHC transforms to aragonite and calcite with time in solution. It is thought that Mg2 concentration in MHC determine the stable mineral species after transformation (Munemoto and Fukushi 2008). Because MHC is a metastable phase, it is expected that MHC is more reactive than calcite. The object of this study is to investigate the uptake behavior of arsenate by MHC.