



Extraction of arsenic in a soil of the blackfoot disease endemic area with ionic liquids

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Speciation of arsenic in the soil of the old blackfoot disease endemic area in the Southern Taiwan has been studied by X-ray absorption near edge structural (XANES) and extended X-ray absorption fine structural (EXAFS) spectroscopy. Experimentally, at the contact time of 30-180 min, 30-40% of As(III) and 40-60% of As(V) in the soil can be extracted with a room temperature ionic liquid (RTIL) [BMI][BF₄] (1-butyl-3-methylimidazolium tetrafluoroborate). For the relatively hydrophobic RTIL [BMI][PF₆] (1-butyl-3-methylimidazolium hexafluorophosphate), on the contrary, 10-15% of As(III) and 20-25% of As(V) can be extracted. By XANES, it is found that an enhanced oxidation of the extracted As(III) (As(III)→As(V)) in the RTIL may occur during the extraction processes. The refined EXAFS spectra also indicate that the bond distances of As(III)-N and As(V)-N in the arsenic-extracted RTILs are 1.76-1.78 and 1.68-1.70 Å, respectively.