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### Interaction of Sb(III) under sulfide-rich reducing environment: Batch and spectroscopic investigations

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This study examined the reaction mechanism of antimonate Sb(III) uptake in iron monosulfide mackinawite and compared its removal capacity and pH-dependent uptake behavior with that of As(III). The comparison of Sb(III) with As(III), based on their chemical similarity, may give useful insight into the chemical properties of the less studied Sb(III). Batch sorption studies revealed that Sb(III) had a higher affinity for mackinawite at pH 5 than pH 7 or 9. While As(III) displayed a similar trend, there was a much higher uptake of Sb(III) under all three pH conditions. A spectroscopic study demonstrated the high uptake of Sb(III) at pH 5 was due to precipitation of the sulfide mineral Sb<sub>2</sub>S<sub>3</sub> as a consequence of the mackinawite dissolution while the removal at pH 7 or 9 was inferred as a surface reaction possibly a sole or mixed reactions of adsorption and surface-precipitation. These pH-dependent Sb(III) uptake mechanisms are similar to the corresponding mechanisms for As(III) uptake, demonstrating that mackinawite is also a good scavenger for Sb(III) in ferrous and sulfide-rich reducing environment like for As(III).

#### Biography

Young-Soo Han has received her BSc (2000) and MSc (2002) from University of Seoul in Environmental Engineering. She got her PhD degree (2009) and worked as a Post-doc in Civil and Environmental Engineering from University of Michigan-Ann Arbor, MI, USA. She also worked as a Post-doc for two years at the Earth Science Division in Lawrence Berkeley National Laboratory, CA, USA. She joined KIGAM in 2013. Her research interests focus on the geochemical behavior of toxic trace metals (particularly, arsenic) and organic contaminants under various redox conditions. Her research interests do not limited to the geochemistry, but she also has been working on the terrestrial soil carbon sequestration and microbial toxicity researches. On these topics, she is author or co-author of more than 20 scientific publications.

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