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Mobility of multiple heavy metalloids in contaminated soil under various redox conditions: Effects of iron sulfide presence and phosphate competition

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1 Mobility of multiple heavy metalloids in contaminated soil under various redox
2 conditions: Effects of iron sulfide presence and phosphate competition

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11 Abstract

12 The mobility of heavy metalloids including As, Sb, Mo, W, and Cr in soil was investigated under both
13 reducing and oxidizing conditions. The effects of soil mineralogy and the presence of competitive
14 anions were studied as important factors affecting the mobility of these contaminants. Batch
15 experiments conducted with the addition of oxidized and fresh FeS exhibited enhanced sorption rates
16 for As and W under oxidizing conditions, and for Mo under reducing conditions. The inhibitory effect
17 of phosphate on the sorption rates was most apparent for As and Mo under both oxidizing and
18 reducing conditions, while only a small phosphate effect was observed for Sb and W. For Sb and W
19 mobility, pH was determined to be the most important controlling factor. The results of long-term
20 batch experiments revealed that differences in the mobility of metalloids, particularly As, were also
21 influenced by microbial activity in the oxidizing and reducing conditions.

22 **Key words: redox-sensitive elements, FeS, Fe(III)-(hydr)oxides, remobilization**

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