Distribution and chemical speciation of molybdenum in river and pond sediments affected by mining activity in Erdenet city, Mongolia

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Abstract: Rivers and ponds near the Erdenet mine, among the world’ s largest copper–molybdenum mines, exhibit high concentrations of molybdenum (Mo). This study was conducted to evaluate the distribution and chemical speciation of Mo in sediments from ponds and rivers in Erdenet city to elucidate the mobility and solubility of Mo in the aquatic environments in the area. The waters and sediments were collected in two ponds connected to the tailing pond and three rivers flowing through Erdenet city. The distribution and chemical speciation of Mo in the sediments were examined using five-step sequential extraction and X-ray absorption fine structure (XAFS) analyses. The XAFS spectra of the sediments showed that large amounts of Mo in the river and pond sediments are molybdate or polymeric molybdate, weakly adsorbed onto ferrihydrite. Sequential extraction consistently showed a large amount of Mo distributed in the labile fraction. Results suggest that the pond and river sediments play a role as a secondary contamination source of Mo rather than as a sink of Mo in the area.

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