Abstract Submitted
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Sorption mechanisms of metals to multi-layer graphene oxide. ALLISON SHOWALTER, Univ of Notre Dame, THOMAS DUSTER, National Institute of Standards and Technology, JENNIFER SZYMANOWSKI, CHONGZHENG NA, JEREMY FEIN, BRUCE BUNKER, Univ of Notre Dame — Environmental toxic metal contamination remediation and prevention is an ongoing issue. Graphene oxide is highly sorptive for many heavy metals over a wide pH range under different ionic strength conditions. We present x-ray absorption fine structure (XAFS) spectroscopy results investigating the binding environment of Pb(II), Cd(II) and U(VI) ions onto multi-layered graphene oxide (MLGO). Analysis indicates that the dominant sorption mechanism of Pb to MLGO changes as a function of pH, with increasing inner sphere contribution as pH increases. In contrast, the sorption mechanism of Cd to MLGO remains constant under the studied pH range. This adsorption mechanism is an electrostatic attraction between the hydrated Cd^{+2} ion and the MLGO surface. The U(VI), present as a uranyl ion, changes only subtly as a function of pH and is bound to the surface via an inner sphere bond. Since each metal exhibits unique binding properties, it might be possible to cater the MLGO in order to best adsorb specific metal ions and optimize the environmental remediation or prevention in filtration systems.

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