

Real time oxidation of FeS using synchrotron x-ray beam energy

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FeS has been recognized as a good scavenger for arsenic and other redox sensitive contaminants under anoxic conditions. To create a suitable adsorbent for flow-through systems such as permeable reactive barriers, it has been suggested that this material can be coated onto sand. To apply the FeS-coated sand in field conditions, the oxygen sensitivity of FeS would be one of the most difficult problems to overcome. In this study, FeS suspension was modified using L-cysteine to enhance the oxidation resistance of FeS. The oxidation resistances of FeS and modified FeS(mFeS) were then tested with in-situ oxidation experiment using a synchrotron X-ray beam energy. With the developed synchrotron beam-induced oxidation method, the oxidation state of sample could be effectively measured in real time. Contrary to expectations, the results of the oxidation test using X-ray beam energy, however, showed that the mFeS was not successfully modified in terms of its oxidation-resistance. The original FeS showed the slower oxidation rate compared to that of mFeS. Although the attempt of the modification of FeS to the oxygen-resistant phase ended in failure, this study provides many useful information regarding chemical properties of FeS system under various pe and pH conditions and suggests a novel real time oxidation test method using a synchrotron X-ray beam energy.