Background

The research is designed to provide new insights into the under-explored areas of oxide, in 30 mM NaHCO₃ + 20% CO₂(g), pH 7.

Current Results

An unusual reaction is observed in which the production of U(VI) exhibits characteristics of an autocatalytic reaction. The initial rate is slower than at intermediate times when a catalytic mechanism becomes evident. The rate of U(VI) production in no Mn oxide controls confirms the ratio predicted based on the independently measured oxidation state of U and Mn in the original solids. (data points and error bars represent the mean ± 1 std error).

Key Findings

- Oxidation of biogenic uraninite by MnO₂, am (a)
- Acceptor – see Figure 9 below
- Autocatalytic reaction – see Figure 9 below
- Oxidation of biogenic uraninite by hydrous manganese oxide. (a) The production of U(VI) exhibits characteristics of an autocatalytic reaction. The initial rate is slower than at intermediate times when a catalytic mechanism becomes evident. The rate of U(VI) production in no Mn oxide controls confirms the ratio predicted based on the independently measured oxidation state of U and Mn in the original solids. (data points and error bars represent the mean ± 1 std error).

Figure 8: Reduction of U(VI) by pseudomonas in the absence and presence of MnO₂. Oxidation of U(IV) by MnO₂ is increased in the presence of MnO₂. (a) Distribution of U(VI) in the absence and presence of MnO₂. (b) Distribution of U(VI) in the absence and presence of MnO₂. (c) Distribution of U(VI) in the absence and presence of MnO₂. (d) Distribution of U(VI) in the absence and presence of MnO₂. (e) Distribution of U(VI) in the absence and presence of MnO₂. (f) Distribution of U(VI) in the absence and presence of MnO₂.