

7 3**REDUCTION OF HEXAVALENT CHROMIUM BY PYRITE RICH ANDESITE IN DIFFERENT ANIONIC SOLUTIONS**Jae Gon Kim^{1*} · Pil-Kyun Jung² · Hi-Soo Moon¹ · Chol-Min Chon¹¹Dept. of Earth System Sciences, Yonsei University.²National Institute of Agricultural Science and Technology, Suwon, Korea.

Introduction of hexavalent chromium [Cr(VI)] to environment has been an environmental concern due to its toxicity and mobility. In treatment process of wastewater, groundwater, and soil contaminated with Cr(VI), reduction of Cr(VI) to trivalent chromium [Cr(III)] and subsequent precipitation of insoluble Cr(III) compound are generally employed. Finely ground andesite containing 11.8% of pyrite was reacted with Cr(VI) solutions (0 to 400 mg l⁻¹) in the presence of dissolved oxygen and 0.01 to 0.1M of KCl, K₂SO₄, or KH₂PO₄. Before and after the reaction, the morphology of pyrite was also examined with a scanning electron microscope (SEM). The andesite was an effective Cr reductant in KCl and K₂SO₄ solutions but KH₂PO₄ decreased the Cr(VI) reduction capacity of the andesite. The higher initial Cr(VI), the more Cr(VI) reduced to Cr(III) in KCl and K₂SO₄ solutions but no relationship between initial Cr(VI) concentration and amount of reduced Cr(VI) in KH₂PO₄ solutions was observed. The final solution pH for KCl and K₂SO₄ increased with increasing initial Cr(VI) concentration. For KH₂PO₄, the pH was not significantly changed with changing initial Cr(VI) concentration but increased with increasing KH₂PO₄ concentration. Concentration of aqueous ferrous iron [Fe(II)] nonstoichiometrically decreased with increasing amount of reduced Cr. The changes in solution pH and concentrations of Fe(II) and Cr(VI) indicate that oxidation of pyrite by dissolved oxygen and reduction of Cr(VI) both at solid-solution interface and in solution occurred at same time. Pyrite had relatively smooth surfaces and sharp edges before Cr reduction but showed rough surfaces, dissolution pits on surfaces, and smoothed edges after Cr reduction.