



Temperature dependence of hexavalent Cr reduction by natural organic matter in Cr(VI)-doped latosol soil

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Cr([U+2165]) reduction in natural organic matter (NOM)-bearing Latosol soil was investigated under various heating conditions at $\leq 105^{\circ}\text{C}$. An enhanced Cr([U+2165]) reduction level has been observed for the reaction at higher temperature, as well as for the reaction in liquid media. Cr(OH)₃ was determined by X-ray absorption spectroscopy (XAS) as the key chromium species after about 90% Cr(VI) reduction. Solid-state ¹³C NMR results demonstrated that, after the Cr(VI) reduction, the aliphatic carbons, oxygenated aliphatic carbons, acetalic carbons, and carboxylic/carbonyl carbons of the NOM were dramatically oxidized; whereas most aromatic/phenolic carbons were quite resistant to the oxidation by Cr(VI). This study implies a potential remedy method by using the heat from industrial flue gas to chemically reduce Cr(VI) in NOM-bearing or organics-amended soils that has been contaminated with Cr(VI).