
Effect of Photolytic Oxalate Treatment on Soil Hydroxy-Interlayered Vermiculites

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Abstract: The effects of Na-citrate-dithionite (NaCD), ammonium oxalate in the dark (NH₄Ox-D), and photolytic reaction under ultraviolet radiation (NH₄Ox-P) on the mineralogy of <2- μ m fractions of selected soils from Virginia were investigated. The NH₄Ox-D treatment removed the smallest amounts of Al (<0.22%) and Fe (<0.50%) from all soils, indicating low levels of noncrystalline material in these materials. From the six soils examined, NH₄Ox-P treatment extracted 5– 62% more Fe and 12– 300% more Al than the NaCD treatment. The NH₄Ox-D and NaCD treatments revealed no X-ray diffraction detectable alterations to mineral phases present in <2- μ m fractions of these soils. The NH₄Ox-P treatment, on the other hand, produced considerable degradation of hydroxy-interlayered vermiculites in these soils, as evidenced by a shift of the 14- Å X-ray diffraction maxima to lower spacings with heat treatment of the sample. The NH₄Ox-P treatment removed variable amounts of hydroxy-Al material from the interlayers of 2:1 layer silicates, depending on their stability and degree of development.

Key Words: Hydroxy-interlayer • Iron oxide • Noncrystalline • Oxalate extraction • Photolytic reaction • Soil • Vermiculite

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