Catalytic Action of Copper on the Oxidation of Structural Iron in Vermiculitized Biotite

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Abstract: The ferrous iron content of two vermiculitized biotites decreased by treatment with 0.1 N salts of copper at 70 ° C from 9.1 – 14% to 1.8 – 2.6%. Presumably, interlayer copper ions acted as a catalyst (here, an electron carrier) for the oxidation of iron by dissolved oxygen. The oxidized iron was ejected from the structure and formed crystalline iron minerals, such as hematite and goethite. Weight loss determinations, chemical, and X-ray powder diffraction data suggest that Cu(II) ions were polymerized to hydroxy-hydrous compounds in the interlayer space. Poor exchangeability of the resultant complex is attributed to the formation of strong electrostatic attractions between OH groups of the interlayer complexes and silicate oxygens.

Key Words: Biotite • Catalyst • Copper • Iron • Oxidation • Vermiculite

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