# Residual Manganese(II) Entrapped in Single-Layer-Hydrate Montmorillonite Interlayers

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**Abstract:** Electron paramagnetic resonance (EPR) and Fourier transform infrared (FTIR) spectroscopy in combination with X-ray diffractometry and thermal methods were used to determine the coordination of residual exchangeable Mn(II) in an untreated sample of Wyoming montmorillonite. At room temperature, Mn(II) in a single-layer-hydrate interlayer was proposed to be coordinated directly with oxygen ions of the siloxane surface on one layer and to form water bridges to the oxygens on the siloxane surface of the opposite layer. Dehydration and collapse of the interlayer entrapped and thereby stabilized the partially solvated Mn(II) up to 600 ° C. A change to Mn(II) in highly symmetric coordination occurred during dehydroxylation of the montmorillonite structure between 600 ° C and 700 ° C. Manganese(II) remained coordinated at the surface but positioned in a bicapped trigonal antiprism formed by oxygens of the silicate structure. This coordination was metastable at 800 ° C when the structural decomposition of the clay mineral began.

**Key words:** Electron paramagnetic resonance • Mn(II) coordination • Montmorillonite

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