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# Nuclear Magnetic Resonance (NMR) Study of Cd<sup>2+</sup> Sorption on Montmorillonite

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**Abstract:** <sup>113</sup>Cd solid-state nuclear magnetic resonance (NMR) was used to identify possible Cd<sup>2+</sup> adsorption sites in montmorillonite. The montmorillonite was treated with 0.1 and 1 M CdCl<sub>2</sub> aqueous solutions and samples with 13 and 8-μm particle size were used. The data are consistent with a two-site model for sorption of Cd<sup>2+</sup> on montmorillonite. Cd<sup>2+</sup> is localized in the montmorillonite in two different sites: 1) in the interlayers as hydrated Cd<sup>2+</sup> and 2) on the external surface, probably with few H<sub>2</sub>O molecules hydrating to it. Cadmium is also adsorbed as CdCl<sup>+</sup> in the interlayer. Treatment with a 0.1 M CdCl<sub>2</sub> solution produces adsorption of free Cd<sup>2+</sup> in the interlayer whereas treatment with 1 M CdCl<sub>2</sub> resulted in adsorption of Cd<sup>2+</sup> in both the interlayer and on surface sites and the adsorption of CdCl<sup>+</sup> in the interlayer. A larger particle size favors Cd<sup>2+</sup> adsorption on the external surface whereas a smaller particle size favors Cd<sup>2+</sup> adsorption in the interlayer.

**Key Words:** Adsorption • Cadmium • Montmorillonite • Nuclear Magnetic Resonance

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