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# Mobility and Reactions of $\text{VO}^{2+}$ on Hydrated Smectite Surfaces<sup>1</sup>

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**Abstract:** The electron spin resonance (ESR) spectra of varying quantities of vanadyl ion ( $\text{VO}^{2+}$ ) adsorbed on hydrated hectorite indicated that hydrolysis of  $\text{VO}^{2+}$  was promoted at low levels of adsorption. The hydrolyzed product was adsorbed on the clay surfaces, with a ligand environment that was partially aqueous and partially hydroxide in nature. Greater amounts of  $\text{VO}^{2+}$  adsorbed on wetted hectorite obscured the ESR spectrum of the strongly adsorbed hydrolysis product with a solutionlike spectrum. An approximately 50% reduction in rotational mobility of  $\text{VO}^{2+}$  relative to solution was indicated by the linewidth of this spectrum. Loss in mobility occurred with reduction of the interlamellar spacing until, under strongly dehydrating conditions, the  $\text{VO}(\text{H}_2\text{O})_5^{2+}$  ions became aligned with the V=O bond axis normal to the plane of the clay platelets.

**Key Words:** Adsorption • ESR • Smectite • Vanadium

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