
Reduction of the Cation-Exchange Capacity of Montmorillonite by Take-Up of Hydroxy-Al Polymers¹

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Abstract: The cation-exchange capacity (CEC) of Na-Al- and Ca-Al-montmorillonite after neutralization with NaOH or Ca(OH)₂ was studied at three Al levels: 10, 25, and 50% of the CEC. Hydroxy-Al polymers were effective in reducing the CEC of Na-montmorillonite (by more than 46%), the exact effectiveness being dependent on the hydroxy-Al content. The hydroxy-Al polymers were less effective in reducing the CEC of Ca-montmorillonite (less than 26%). The CEC reduction was equal to or larger than the amount of the untitrated Al. The electrostatic charges of the clay which were blocked by the hydroxy-Al polymers were compensated for by both the positive charge of the hydroxy-Al polymers and the trapped cations on the clay surfaces. These cations remained on the clay even after extensive washing with 0.1 M KCl.

Key Words: Cation-exchange capacity • Hydroxy-Al polymer • Interlayer • Montmorillonite • Smectite

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