
Formation of Polyethylene Glycol on Montmorillonite by Sterilization with Ethylene Oxide

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Abstract: The effect of ethylene oxide-sterilization on homoionic (Na^+ , K^+ , Ca^{2+} , Cu^{2+} , Al^{3+} , and Fe^{3+}) montmorillonite samples was examined. The results indicate that ethylene oxide polymerized to polyethylene glycol in the interlayer of Cu^{2+} -, Al^{3+} -, and Fe^{3+} -saturated clays, as substantiated by the increase in the $d(001)$ values, as well as by the decrease in the cation-exchange capacity after reaction. On the contrary, ethylene oxide failed to react in the presence of the Na^+ -, K^+ -, and Ca^{2+} -clays, likely due to the lower acidity of the exchange cations.

Key Words: Adsorption • Infrared spectroscopy • Ethylene oxide • Interlayer cations • Montmorillonite • Polymerization • Sterilization • X-ray powder diffraction

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