
Interaction of Phenamiphos with Montmorillonite

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Abstract: Phenamiphos interacted with homoionic montmorillonites of Ca^{2+} , Mn^{2+} , Co^{2+} , and Ni^{2+} to form interlayer complexes having basal spacings of about 16.5/Å. In the infrared spectra, the ν -PO bands were displaced towards lower frequencies suggesting that this group interacted with the exchange cations. Moreover, a small shoulder at 1600 cm^{-1} indicated the partial protonation of the phenamiphos. After heating the complexes to 110° , 160° , and 200° C , however, the bands corresponding to $\delta\text{-NH}_2^+$ and $\nu\text{-NH}$ intensified because of increased protonation, whereas the ν -PO bands had the same intensity as in pure phenamiphos. The fundamental implication of these observations is that phenamiphos interacts with exchange cations through molecules of coordinated water, possibly by means of the P=O group.

Key Words: Infrared spectroscopy • Montmorillonite • Organophosphorus compound • Pesticide • Phenamiphos • Protonation

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