
Solid-State Intercalation of Naphthalene and Anthracene into Alkylammonium-Montmorillonites

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Abstract: Intercalation of naphthalene and anthracene into alkyltrimethylammonium ($C_nH_{2n+1}(CH_3)_3N^+$; $n = 8, 12, 14, 16,$ and 18)-montmorillonites was carried out by novel solid-solid reactions at room temperature. Octyltrimethylammonium(C8)-montmorillonite did not form an intercalation compound with either naphthalene or anthracene. Naphthalene was intercalated into both dodecyltrimethylammonium(C12)- and octadecyltrimethylammonium(C18)-montmorillonites to give intercalation compounds. On the other hand, the solid-solid reaction between dodecyltrimethylammonium(C12)- or tetradecyltrimethylammonium(C14)-montmorillonite and anthracene gave only partly intercalated compounds while hexadecyltrimethylammonium(C16)- and octadecyltrimethylammonium(C18)-montmorillonites gave single phase intercalation compounds. The hydrophobic interactions between alkylammonium-montmorillonites and the aromatic compounds are thought to be the driving force for the solid-state intercalation. The extent of the increase in the basal spacing may also be involved in the different reactivity.

Key Words: Alkylammonium-montmorillonites • Anthracene • Intercalation • Naphthalene • Solid-state intercalation

Clays and Clay Minerals; October 1992 v. 40; no. 5; p. 485-490; DOI: [10.1346/CCMN.1992.0400501](https://doi.org/10.1346/CCMN.1992.0400501)

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