
Potassium Halide-Treated Montmorillonite (KTM) as a Solid Phase in Liquid Chromatography

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Abstract: Columns for high pressure liquid chromatography were prepared from spray dried samples of montmorillonite that were heated with potassium halides (KTM) to increase both the cation density on the clay surfaces and the expandability of the interlayers. Some of the clay samples were exchanged with Cu before and/or after the potassium halide treatment.

Retention of nitrobenzene and its chloro and methyl derivatives, of methyl substituted phenols and of nitrophenols on these columns was studied, using eluents ranging in polarity from hexane to isopropanol. The retention of the aromatic molecules depends on their specific interaction with active sites on the clay surfaces and on steric effects which limit access to the clay interlayers. Both penetrability and surface interaction are controlled by the composition and method of preparation of the solid phase and by the polarity of the mobile phase. Very strong adsorption of some eluates and efficient chromatographic separations between related substituted benzenes were achieved. Mixtures of the three isomers of cresol, chloronitrobenzene, nitrotoluene or nitrophenol were completely resolved by a judicious combination of solid phase and eluent.

Key Words: Disubstituted benzenes • HPLC • Montmorillonite • Potassium halides

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