
Adsorption Properties of Montmorillonite and Synthetic Saponite as Packing Materials in Liquid-Column Chromatography

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Abstract: The adsorption of tris(1,10-phenanthroline)-ruthenium(II) ($\text{Ru}(\text{phen})_3^{2+}$) by two kinds of colloiddally dispersed clays, sodium montmorillonite and synthetic saponite, was studied by spectrophotometric and electron-optical methods. Montmorillonite adsorbed this complex stronger than saponite. The electronic spectrum measurements suggested that the electronic states of the complex were more perturbed on adsorption by montmorillonite than by saponite. High-performance liquid chromatography was attempted on an ion-exchanged adduct of optically active $\text{Ru}(\text{phen})_3^{2+}$ and these clays. 1,1'-Binaphthol was eluted with a t: 1 (v/v) water-methanol mixture as an eluent. The compound was resolved with a separation factor of 15 and 1.4 on the saponite and montmorillonite columns, respectively. If tris(acetylacetonato)-chromium(III) was eluted with water, the compound was resolved with separation factors of 1.9 and 11 on the saponite and montmorillonite columns, respectively. These separation tendencies were probably due to the difference in the external surface area and the density of the bound chelates.

Key Words: Adsorption • Electronic absorption • Liquid-column chromatography • Montmorillonite • Ruthenium phenanthroline • Saponite

Clays and Clay Minerals; December 1988 v. 36; no. 6; p. 530-536; DOI: [10.1346/CCMN.1988.0360606](https://doi.org/10.1346/CCMN.1988.0360606)

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