

- 平成8年度入学 大学院博士後期課程 物質工学専攻(生物有機化学講座)

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論文題目: Adsorption and Separation Properties of Organic/Inorganic Hybrid
Nanocomposites Derived from Inorganic Layered Compounds

和訳題目: 無機層状化合物から誘導される有機-無機ナノ複合体の吸着及び分離特性

Abstract

During this thesis work, the author carried out the preparation of organic/inorganic layered hybrid nano-compounds, in which the adsorption and separation behavior may be influenced by the organic compounds.

This thesis is composed of seven chapters.

The Chapter 1 is the introduction section. This chapter deals with the intercalation reaction and the possibility of intercalation compounds as separation materials. Moreover, in this section, the purpose of this thesis is shown.

In Chapter 2, the intercalation behavior of naphthalenecarboxylate ions into the layered double hydroxide (LDH) is reported. The author tried the separation of 2,6-naphthalenedicarboxylic acid (2,6-NDCA) from the mixture of 2,6- and 2,7-NDCA and the preferential intercalation of 2,6-NDCA into the LDH was observed.

In Chapter 3, the study on a new intercalation method is reported. To intercalate various organic compounds, we have tried to modify the LDH surface by the esterification reaction of the hydroxyl groups, and the author has examined the possibility of a new intercalation method different from that with electrostatic interaction.

In Chapter 4, the ion-exchange reaction of alkyl carboxylate ions into the hydroxy double salt (HDS) is shown. Nitrate and acetate anions of HDS were exchanged with anionic mono- and di-carboxylate ions, and the author confirmed that the interlayer spacing of HDS increased depending on the size of mono- and di-carboxylate ions.

In Chapter 5, the incorporation of neutral organic compounds into HDS exchanged by the alkyl carboxylate is reported. The author examines the selective incorporation of neutral organic compounds by using HDS exchanged by the alkyl carboxylate.

In Chapter 6, the application of the HDS exchanged by the alkyl carboxylate for a stationary phase in gas chromatography is shown. The author examines gas chromatography as a way of determining the accessibility of the hydrophobic interlayer region of HDS exchanged by the alkyl carboxylate to organic molecules from the vapor phase.

Concluding remarks and scope in the future are given in Chapter 7.