Complexes of Non-chiral Surfactant Molecules With Chiral and Racemic Compounds

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Understanding the interactions between two different types of molecules in the complex crystal become important in the study of molecular recognition and crystal engineering. Particularly, the molecular recognition in the complex crystal is a subject of considerable interest because of its applications to separation purposes. A few years ago, it was reported [1] that an interaction between a chiral onium salt (Cinchonidinium Chloride) and racemic compound (Bis-β-naphthol) accomplishes a successful enantiomeric resolution, but many researchers are interested in exploiting economical means of resolving racemic compounds such as probable useage of a non-chiral host molecule. This is a difficult task yet to be achieved.

As an initial approach in our investigations, the crystallization of non-chiral host compound (monoalkyltrimethylammonium halides) with (R)-(+)-1,1'-Bi-2-naphthol (RBNP) and Rac-1,1'-Bi-2-naphthol (BNP) were chosen to investigate the molecular recognition between non-chiral host compound and chiral as well as racemic compound from the viewpoint of crystal structure studies in order to know the feasible interactions , molecular packing structures and space groups of such complexes. The investigations revealed that the hexyltrimethylammonium bromide (6TAB) and octyltrimethylammonium bromide (8TAB) interact with RBNP and BNP to form molecular complexes (6TAB/RBNP, 6TAB/BNP, 8TAB/RBNP and 8TAB/BNP) by crystallization or mixing of powdered samples in a mortar. Both 6TAB/RBNP and 8TAB/RBNP molecules crystallize in monoclinic space group $P2_1$, whilst 6TAB/BNP and 8TAB/BNP crystallize in triclinic space group $P\bar{1}$ and monoclinic space group $P2_1/c$, respectively. Hydrogen bonds and C-H$\cdots\pi$ interactions stabilize the crystal structures and also contribute to the different packing modes observed in the complexes.

[1] Toda F., Tanaka T., *Chem. Commun*., 1997, **12**, 1087.

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