Poster Presentation

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Guest-induced fluorescence property of macrocyclic boronic ester

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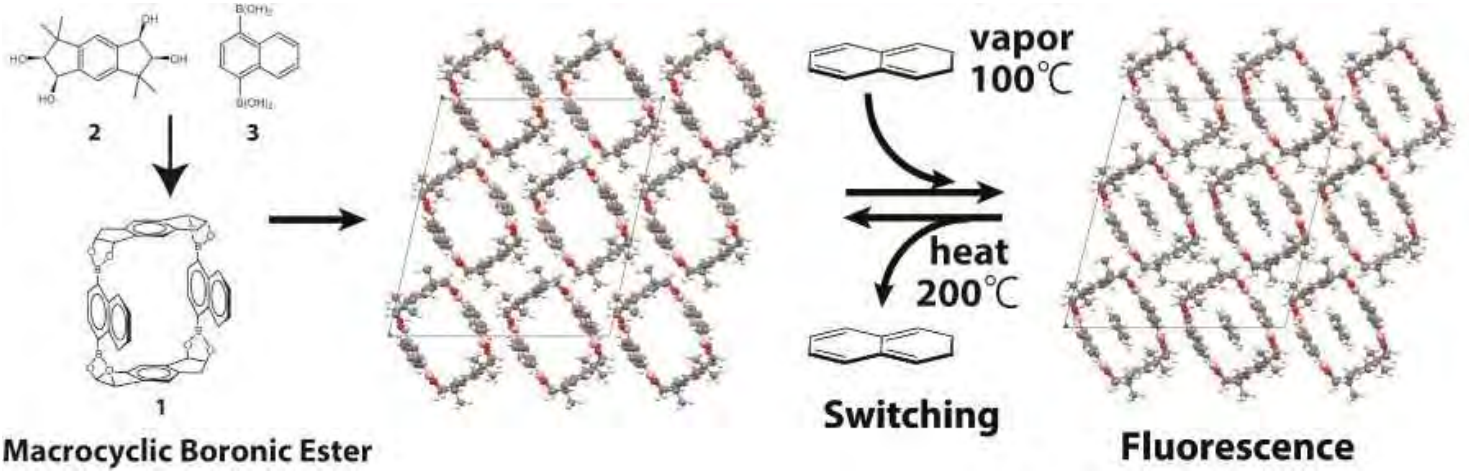
Macrocyclic boronic esters (1) are obtained as a self-assembled molecule by condensation reaction between rac-tetrol (2) and 1,4-naphthalenediboronic acid (3) in the presence of toluene molecule [1]. In the crystal, this macrocyclic molecules form a charasteristic one dimensional channel structure that accommodates various small molecules. Interestingly, reversible desorption / absorption phenomena of guest molecules is observed without significant crystal packing change, meaning this crystal may have guest storage, separation, and catalytic abilities. In the course of exploring further functional aspects of the molecule, we give fluorescence property to this crystal by inclusion of acene molecules into this robust one dimensional channel structure. Naphthalene inclusion crystal was obtained by the diffusion method. The crystal structure is isostructural to known crystals, that is, a naphthalene molecule is included in a channel and sandwiched by two naphthalene moieties of the macrocyclic molecule (inter planar distance is about 3.6 angstrom). Under UV light, a blue color fluorescence observed in this crystal, suggesting the guest naphthalene molecule contributes the fluorescence property. After heating by 200 degrees C, the naphthalene was released to leave isostructural apohost crystal without fluorescence property. However, by naphthalene vapor exposure to the apohost crystal, the fluorescence property was recovered, which means naphthalene desorption and absorption are possible in crystalline state. Moreover Anthracene and Tetracene inclusion crystal were obtained, and they also showed light blue and yellow color fluorescence under UV light, respectively. Thus, the fluorescence function was successfully realized by inclusion of acene molecule in the one dimensional channel of the crystals, and furthermore the fluorescent color can be controlled by changing acene molecules.

[1] *N. Iwasawa, H. Takahagi, J. Am. Chem. Soc., 129, 7754-7755 (2007)*



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