

A Smart Fluorescent Macrocyclic Cryptand with Recognition-Ability of Novel Neutral Molecules

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In recent year, the development of fluorescent receptor has been attracted and competed because those are useful to analyze and clarify the roles of biomolecules in living systems[1].

Herein, a study on the recognition of neutral molecules by fluorescent receptor has been reported limitedly. This study is crucial to develop the biomimic systems for elucidating the roles of biomolecules in living systems. Therefore, we designed and synthesized aromatic imine conjugated systems containing various substituents as a guest molecule as well as tetraaza macrocycle cryptand L as a host one as shown in Fig. 1. The guest molecules were simply synthesized through imine condensation reaction of 1,4-phthalaldehyde with aniline derivatives in distilled toluene or methylene

X = H, F, Cl, NH₂, CH₃, OCH₃, and N(CH₃)₂

Fig.1. Guest molecules and Cryptand

chloride under the refluxing condition. In addition. d i m -6,17-*N*,*N*-di(9-methylanthryl)-2,6,13,17-tetraazatricyclo [14, 4, 01.18, 07.12] docosane (cryptand L) was prepared as the moderate yield by one-pot reaction of 9-chloromethyl -anthracene with 3,14dimethyl-2,6,13,17-tetraaza-tricyclo [14, 4, 01.18, 07.12] docosane reported previously [2] in methylene chloride under the refluxing condition. The recognition—ability of cryptand L by detection of fluorescence showed very different tendency upon the on kinds of guest molecules although the parent group is same in that molecule. In other words, in the case of guest molecules containing electron donating groups ($X = CH_3$, $N(CH_3)_2$ and OCH_3), the fluorescence of cryptand L was enhanced by addition of those molecules, respectively, while the fluorescence of cryptand L was quenched by addition of guest molecules containing electron withdrawing groups (X = F and Cl), respectively.

We were known from above results that this cryptand L is very smart fluorescent receptor distinguishable from various guest molecules with

only different substituents.

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References

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