

國科會計畫

計畫編號: NSC97-2113-M018-001

研究期間: 9708-9807

螢光化學偵測器的設計及合成  
The Design and Synthesis of Fluorescent Chemosensors

吳安台

中文摘要

對於分析化學的領域而言，螢光化學偵測器的設計及合成是一個相當有趣及有意義的研究。因為螢光分析對於溶液中化學物種的偵測是一個簡單又有用的方法，當含有氮的醣類冠醚上，若具有化學發光基團時，將會是一好的陽離子探針。由於它們的含有氮的醣類冠醚的結構，可以被用來做為陽離子辨識的單位。在有螢光反應的化學偵測器中，pyrene 及 anthracene 是常被用來做為訊號處理的基團。我們企圖引進環狀的含氮的醣類做一個新穎性如環糊精的人工受體，這個想法是基於經由環狀醣分子的排列氮原子及氨基酸官能基可以導致一相當靈敏的辨識作用及摧化。在此計畫中我們試圖要合成一系列的含氮的醣類冠醚並且在其氮原子上引進兩個 pyrenylacetamide 或 anthracene 使其成為一靈敏度高的探針。除此外，為了比較其鉗合金屬的行為，我們也將在含氮的醣類冠醚上，再引進 allyl 基團及冠醚，使其生成具有多重離子探針的螢光化學偵測器。在此計畫關於螢光化學偵測器的工作，將依下列來進行： 1. 具有化學發光基團含氮的醣類冠醚的設計及合成（第一及第二年）。 2. 螢光的分析及研究（第二年）。 3. 含有多重離子探針螢光化學偵測器的合成（第三年）。

關鍵字：螢光化學偵測器；化學發光基團；含有氮的醣類冠醚；醣氨基酸

## Abstract

The design and synthesis of a fluorescent chemosensor is an area of intense research activity and tremendous potential significance to the field of analytical chemistry, because fluorometric analysis is a simple and useful method for prompt detection of chemical species in solution. Sugar-aza-crowns with appropriate appended chromophores would be good candidates for cation probes because of their aza-crown structures which can be used as a cation recognition unit. For the design of sensitive chemosensors having fluorescence responses, pyrene and anthracene subunits are particularly useful as signaling handles. In the part of this project, we intend to introduce cyclic azasugrs as novel cyclodextrin-like artificial receptor. This idea is based upon the assumption that a cyclic array of carbohydrate moieties, nitrogen atom and amino acid functional groups may lead to exquisite specificity of recognition and catalysis. Therefore, we intend to synthesize a series of sugar-aza-crown ethers and introduce two pyrenylacetamide groups or anthracene groups into the two nearby placed nitrogen atoms of SACs as a sensitive probe. Moreover, in order to comparison with the behavior of sensitive, the rim of SACs will be functionalized by attaching allyl group and crown ethers to substituted hydroxyl group as multi channel chemosensors. In this proposal, several works related to fluorescent chemosensors will be carried out as follows: 1. Design and synthesize sugar-aza-crown ethers with appropriate chromophores (first year and second year). 2. Fluorescence analysis and study (second year) 3. Synthesis of a fluorescent chemosensor containing multiple ionophores (third year)

**Key words :** Fluorescent chemosensor; Chromophores; Sugar-aza-crowns; Sugar amino acids