

### 金屬彩虹 - 以配合物反應測試水中重金屬 Metallic rainbow

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#### 作品簡介 Project Introduction

現時水污染問題越趨嚴重，飲用水很大機會含有金屬離子，對人類健康構成威脅。鑒於金屬溶液顏色較淺，很難用肉眼判斷水中是否含有金屬離子，因此我研究了如何用不同配體與金屬離子產生的配合物加深溶液的顏色，從而識別水中金屬離子的類別和濃度。最後，我利用甘氨酸和味精製成了輕便的檢測包（當中配備了一個多孔板盤、一包甘氨酸或味精粉和一個色譜）。人們只需把水樣本與甘氨酸或味精粉混合，然後利用色譜比對配合物的顏色，便可快捷地辨認出金屬離子的種類和濃度。

The problem of water pollution is getting more serious. The existence of heavy metal ions in water is difficult to be observed, yet sufficient to cause harm to human health. In our project, sixteen ligands were mixed with five heavy metal ions ( $\text{Cu}^{2+}$ ,  $\text{Ni}^{2+}$ ,  $\text{Co}^{2+}$ ,  $\text{Cr}^{3+}$  and  $\text{Fe}^{3+}$ ) to form complexes that have much higher colour intensity than aqueous metal ions alone. Calibration curves for complexes were plotted to help deduce heavy metal ion concentration in polluted water. At last, some environmentally friendly ligands (e.g. glycine, MSG) were used in the construction of a handy heavy metal ion test kit.



#### 主要獎項 Major Awards

- 第 14 屆明天小小科學家獎勵活動(2014) - 明天小小科學家稱號  
The 14th Awarding Program for Future Scientists -Future Scientist
- 第 29 屆全國青少年科技創新大賽 創新成果競賽項目二等獎，英特爾英才獎，廣東科學中心專項獎  
The 29<sup>th</sup> China Adolescents Science and Technology Innovation Contest (2014) 2<sup>nd</sup> Place Award, Intel Talent Award and Special Award from Guangdong Science Center
- 香港青少年科技創新大賽 13 - 14 高中化學組一等獎，美國 ASM 材料科學教育基金特別獎  
HK Youth Science and Technology Innovation Competition 13-14 - 1<sup>st</sup> Place Award in Chemistry and Materials science, Special award from Special award from ASM Materials Education Foundation
- 2014 香港中學化學奧林匹克 亞軍  
Hong Kong Chemistry Olympiad for Secondary Schools (2013-2014) - 1st runner up