

# Green Synthesis of Metal Hexacyanoferrate with Conducting Polymer Composite Film Modification Electrodes for Selectively Determination of AA, DA and UA

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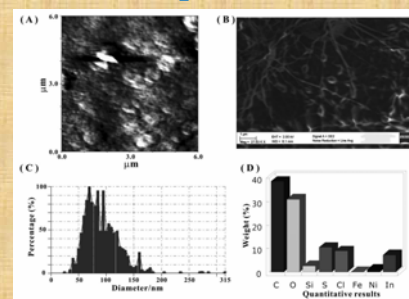
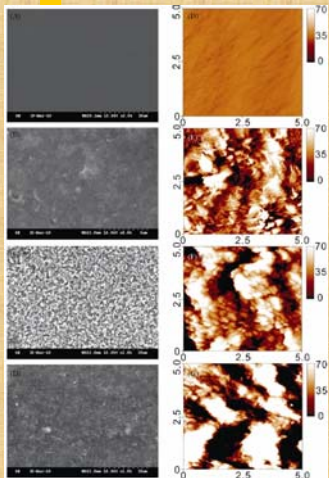
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## 研究重點

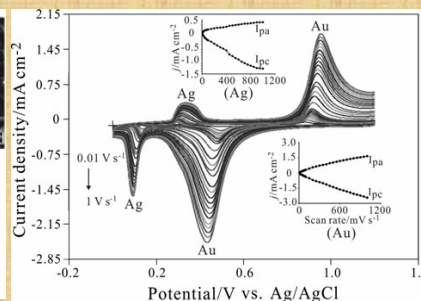
論文題目「綠色合成奈米金屬錯合物結合導電高分子修飾電極為基礎之生物感測器」：主要以利用不同奈米複合材料、導電高分子及奈米碳材料，並以電化學或電漿濺鍍方式修飾於電極上，對各種不同修飾電極進行其特性研究並應用於生物感測器與染料敏化太陽能電池上。

## 研究成果

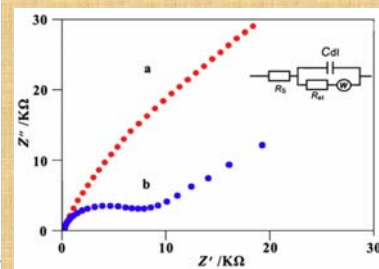
### Composited Nano Materials Modified Electrode



(A) Tapping mode AFM image (2D) of a NiHCF-PEDOT film on a GCE. (B) FE-SEM image (C) AFM cross-sectional analysis graph. (D) EDS analysis.



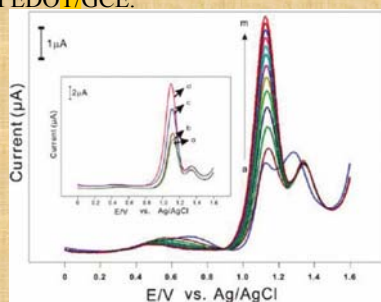
CVs of nano Au-Ag/ionic liquid-Nafion film modified GCE. Scan rate in the range of 0.01–1 V s<sup>-1</sup>.



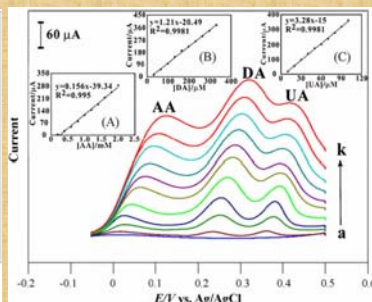
Electrochemical impedance spectra curves of a bare and preanodized SPCE in pH 7.0 PBS containing 5 × 10<sup>-3</sup> M [Fe(CN)<sub>6</sub>]<sup>3-/4-</sup>

SEM and AFM images of (A, E) bare GCE, (B, F) MWCNT/GCE, (C, G) PEDOT/GCE and (D, H)MWCNT-PEDOT/GCE.

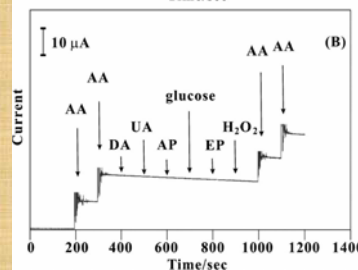
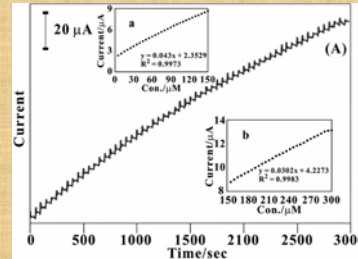
### Electrochemical and Biosensors



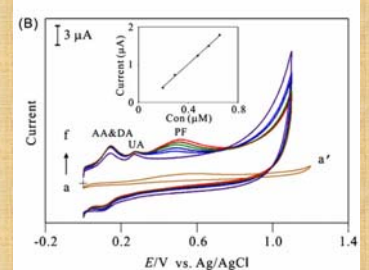
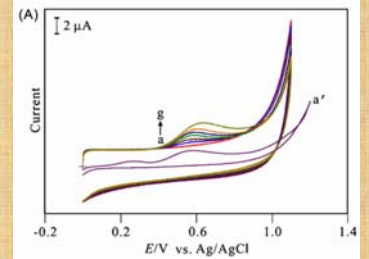
Curves a-m display the DPVs of poly GE for melamine detection in 0.1M H<sub>2</sub>SO<sub>4</sub> solution in the range of 0.06–0.85 ppm, melamine-tainted milk powder. (Inset) in various concentration mixture ratios (a) 1:50, (b) 1:25, (c) 1:10, and (d) 1:3.



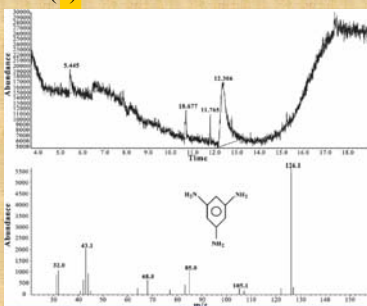
Differential pulse voltammograms of MWCNT-PEDOT/GCE for AA (0 to 2 × 10<sup>-3</sup> M), DA (0 to 3.3 × 10<sup>-4</sup> M), and UA (0 to 1 × 10<sup>-4</sup> M), mixture containing in pH7 PBS solution.



Typical amperometric curve obtained for a NiHCF-PEDOT/GCE in 0.1 M PBS (pH 7.0) at 0.2 V. Stirring rate 1000 rpm. Successive additions of AA in the range 5 × 10<sup>-6</sup> to 3 × 10<sup>-4</sup> M (S/N=3).



(A) CVs of propofol electrooxidation at the preanodized SPCE. The propofol concentrations were in the range of a–g (0 to 0.90 μM; in pH 7.0 PBS). (B) CV response of preanodized SPCE in the presence of interferences (AA, DA, and UA—20, 10, and 50 μM). Propofol concentration in the range of a–f (0, to 0.65 μM)



GC-MS spectrum for melamine detection (5 ppm) in 0.1 M H<sub>2</sub>SO<sub>4</sub> solution.

### 研究生活及心得

大學、碩士班及博士班攻讀了不同的科系，過程雖然辛苦，但最後找到了感興趣的研究領域，也獲得各階段中不同朋友與師長的幫助，使我的研究信念能夠堅持下去。自從就讀博士班後，實驗室的同儕中有許多印度籍學生，閒暇之餘常會與他們交流彼此的民俗風情，也進行論文研究的小組合作，在此過程中英語聽說讀寫能力大有長進，獲益良多。在博士班的生涯中常常遇到許多的挫敗，平時多虧實驗室的師長及學弟妹們陪我一起度過，這次獲得貴社的青睞實為莫大的鼓勵，我將不斷精進自己的專業知識，並爭取國際研討會或合作機會，獲得此次獎助學金的支持，學生會將其作為未來赴國外學術交流的運用，以求增進自己的國際觀，另外要感謝陳生明教授及親愛的家人們對我的支持。