

9<sup>th</sup> World Congress on

# BIOSENSORS AND BIOELECTRONICS

August 29-30, 2018 Tokyo, Japan

## Synthesis of fluorescent carbon nanoparticles as selective and sensitive probes for copper ions

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A novel sensing system has been designed for the detection of copper ions ( $\text{Cu}^{2+}$ ). It is based on the quenched fluorescence signal of carbon nanoparticles (CNPs), which were carbonization from polyvinylpyrrolidone and L-cysteine.  $\text{Cu}^{2+}$  can be captured by the nitrogen and sulfur groups of the CNPs to form an absorbent complex at the surface of CNPs; this results in strong quenching of the CNPs' fluorescence *via* a fast metal-to-ligand binding affinity. The resulting water-soluble CNPs also exhibited a quantum yield of 7.6%, with favorable photoluminescent properties and good photostability. Importantly, the fluorescence intensities of the CNPs were quite stable in high ionic strength (up to 1.0 M NaCl) and over a broad range of pH levels (2.0–12.0). This facile method can therefore develop a sensor that offers rapid, reliable, and selective detection of  $\text{Cu}^{2+}$  with a detection limit as low as 0.15  $\mu\text{M}$  and a dynamic range of 0.5–7.0  $\mu\text{M}$  ( $R^2 = 0.980$ ). This sensing system was also successfully applied to determine  $\text{Cu}^{2+}$  in a lake water sample with satisfactory recovery levels.

### Biography

Tai-Chia Chiu has received his PhD degree in Chemistry from National Taiwan University, Taiwan, in 2003. He is currently working as a Professor of Applied Science at National Taitung University in 2016. He has published more than 50 papers in reputed journals. His current research include the development of analytical techniques for small molecules by capillary electrophoresis and green methods for synthesizing fluorescent carbon dot and its applications.

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