

CARBON NANOSENSORS, FROM LAB-SCALE RESEARCH TO COMMERCIALIZED PRODUCT

Ehsan Eftekhari¹, Ivan S Cole² and Qin Li¹

¹Queensland Micro and Nanotechnology Centre, Griffith University, Australia

²RMIT University, Australia

Mercury contamination in water is a persistent issue due to both natural geological and anthropogenic activities. Portable, facile and affordable sensors for detection and sensing different species of mercuries are highly desirable. We report a highly effective fluorescent, solid state sensor with high sensitivity, good selectivity and excellent reversibility for Hg (II) ion. Hg (II)-responsive carbon dots immobilised polystyrene spheres were fabricated as a middle layer in double heterostructure colloidal photonic crystal film. Significant fluorescence enhancement was achieved due to doubly resonant of the modes of photonic crystals and multi beam interface inside the double heterostructure film. The amplified fluorescence enhances the sensitivity of detection, achieving a detection limit of 91 pM for Hg(II) ion, even 17 times lower than that of carbon dots solution probe. The polystyrene-based film sensor is negligibly responsive to other metal ions and can easily be recovered by rinsing with cysteine.

e.eftekhari@griffith.edu.au