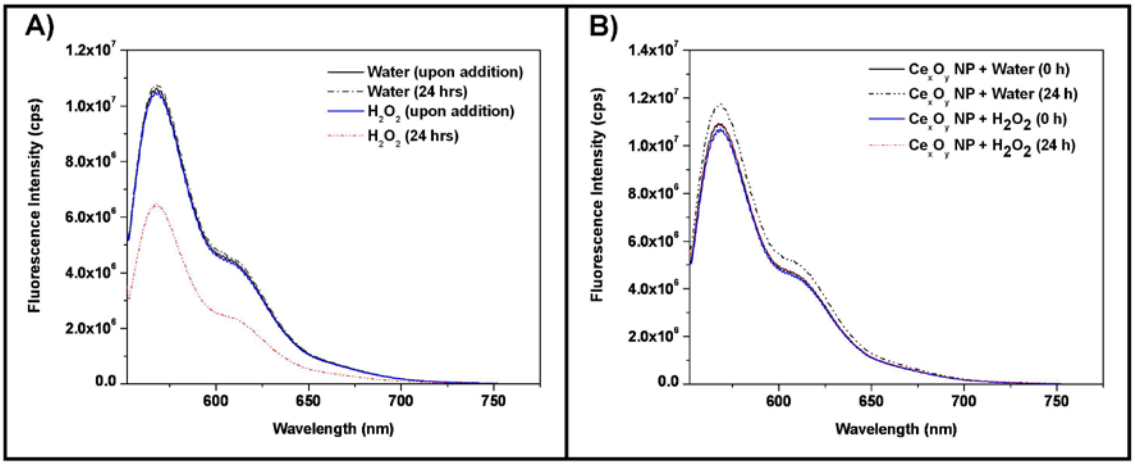
Electronic Supplementary Material (ESI) for Nanoscale

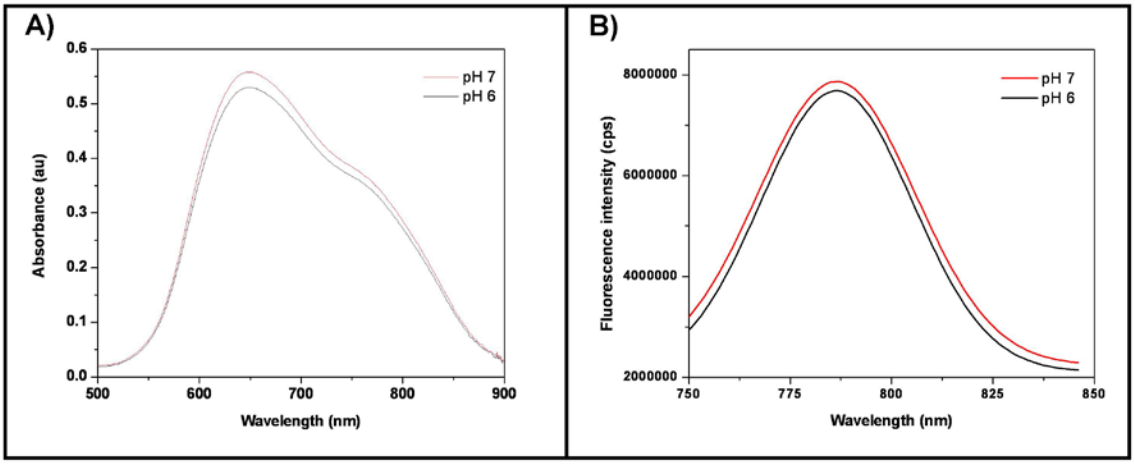
A Cerium Oxide Nanoparticle-based Device for the Detection of Chronic Inflammation via Optical and Magnetic Resonance Imaging

Charalambos Kaittanis,[a] Santimukul Santra,[a] Atul Asati,[a] J. Manuel Perez [ab*]

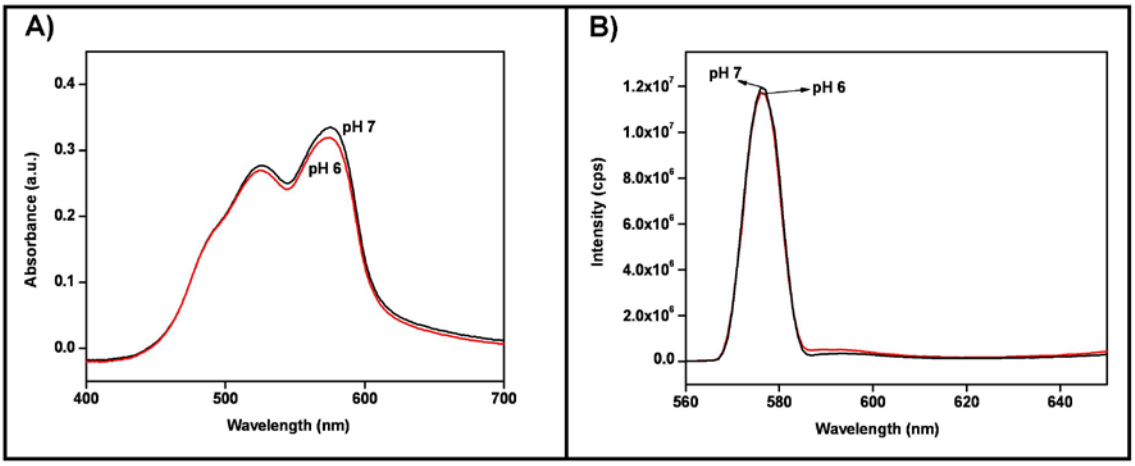
[a] Nanoscience Technology Center, University of Central Florida, Orlando, FL, USA,
[b]Department of Chemistry, University of Central Florida, Orlando, FL, USA
[*]12424 Research Pkwy, Ste 400, Orlando, FL 32826, USA. Email: jmperez@ucf.edu



ESI Fig. 1. Behavior of the fluorophore DiI in the presence of H_2O_2. **A)** Decrease in the dye's fluorescence emission after 24-h incubation with H_2O_2 (1 μM). **B)** Cerium oxide nanoparticles (Ce_xO_y NP) preserve DiI's fluorescence emission from hydrogen peroxide.



ESI Fig. 2. The near-infrared fluorophore DiR is stable fluorescence emission at physiological and acidic pH. (**A**) Absorbance and (**B**) fluorescence emission spectra are depicted.



ESI Fig. 3. The indocyanine fluorophore DiI exhibits stable fluorescence emission at physiological and acidic pH. (**A**) Absorbance and (**B**) fluorescence emission spectra.

ESI Table 1. Loss of Ce_xO_y NP's antioxidant activity at acidic conditions or high concentrations of hydrogen peroxide is attributed to the changes on the nanoparticles' mixed valence (Ce^{+3}/Ce^{+4}) state, preventing them to regenerate.

Ce_xO_y NP	Ce^{+3}	Ce^{+4}	
0 μM H_2O_2 (pH 7)	57 %	43 %	
0 μM H_2O_2 (pH 6)	61 %	39 %	
1 μM H_2O_2 (pH 7)	58 %	42 %	Regeneration
1 μM H_2O_2 (pH 6)	44 %	56 %	No Regeneration
6 μM H_2O_2 (pH 7)	39 %	61 %	