

Electronic Supplementary Information

Synthesis, Characterization of Nickel@Carbon Dots Hybrid

Material and Application in Reduction Cr (VI)

*Yali Guo, Dan Wang, Xiaoyu Liu, Xudong Wang, Weisheng Liu and Wenwu Qin**

[Sep 10, 2014]

Key Laboratory of Nonferrous Metal Chemistry and Resources Utilization of Gansu Province and State Key Laboratory of Applied Organic Chemistry, College of Chemistry and Chemical Engineering, Lanzhou University, Lanzhou 730000, P. R. China.

S1. EXPERIMENTAL SECTION

S1.1 Preparation of bare Ni nanoparticles

Bare Ni nanoparticles (NPs) were prepared following a reported method²⁸. A mixture of Ni(acac)₂(0.77g) and TOP (4.0 mL) in oleylamine (20 mL) was slowly heated from room temperature to 230 °C for 20 min under inert atmosphere, and allowed to stir at 230 °C for 40 min. After cooling the reaction mixture, the colloidal particles were separated by adding ethanol (40 mL) and centrifuging at 10,000 rpm for 20 min. Finally, the nickel nanoparticles were dispersed in cyclohexane.

S1.2 Experimental condition of control experiments

S1.2.1 Reduction of Cr (VI) by HCOOH in the presence of bare Ni nanoparticles

The reaction solution was mixed with 10 mL of a 1 mM Cr (VI), 1 mL of formic acid (98.5%) and 9 mL of H₂O, the PH of the mixture was adjusted to 2.0. The absorption spectrum was recorded just after the preparation of this solution. 0.5 mL of colloidal Ni nanoparticles was then added to the reaction mixture, and absorption spectra were recorded in 2 min intervals.

S1.2.2 Reduction of Cr (VI) by HCOOH in the presence of pure C-dots

The reaction solution was mixed with 10 mL of a 1mM Cr (VI), 1 mL of formic acid (98.5%) and 9 mL of H₂O, the PH of the mixture was adjusted to 2.0. The absorption spectrum was recorded just after the preparation of this solution. 0.5mL of aqueous suspension of C-dots was then added to the reaction mixture, and absorption spectra were recorded in 2 min intervals.

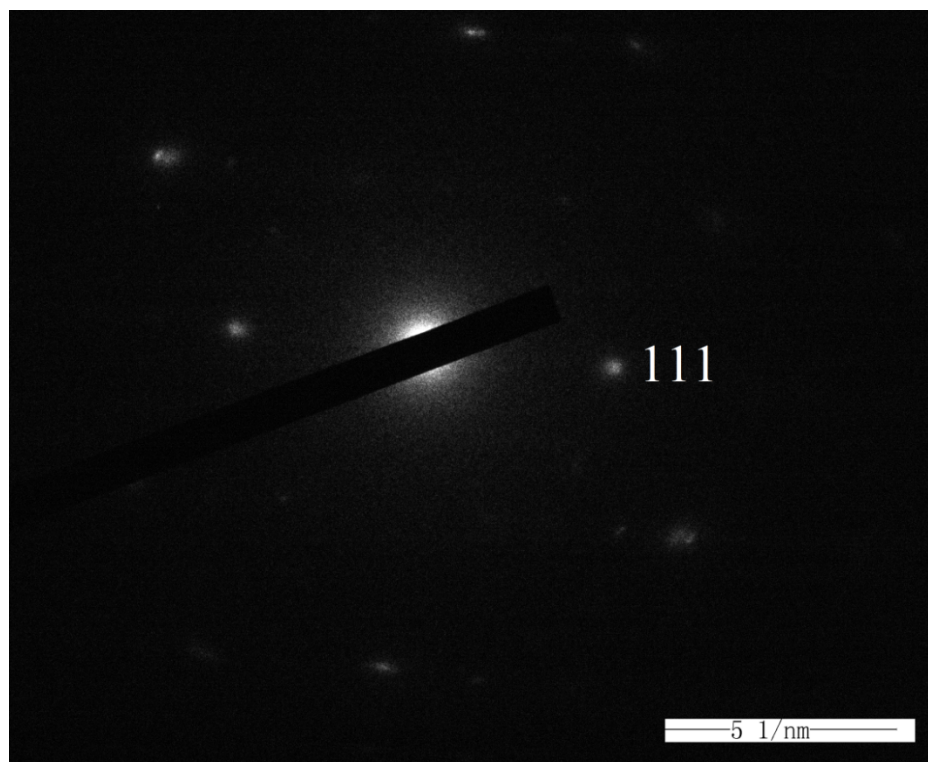


Figure S1. SAED pattern of Ni@C-dots

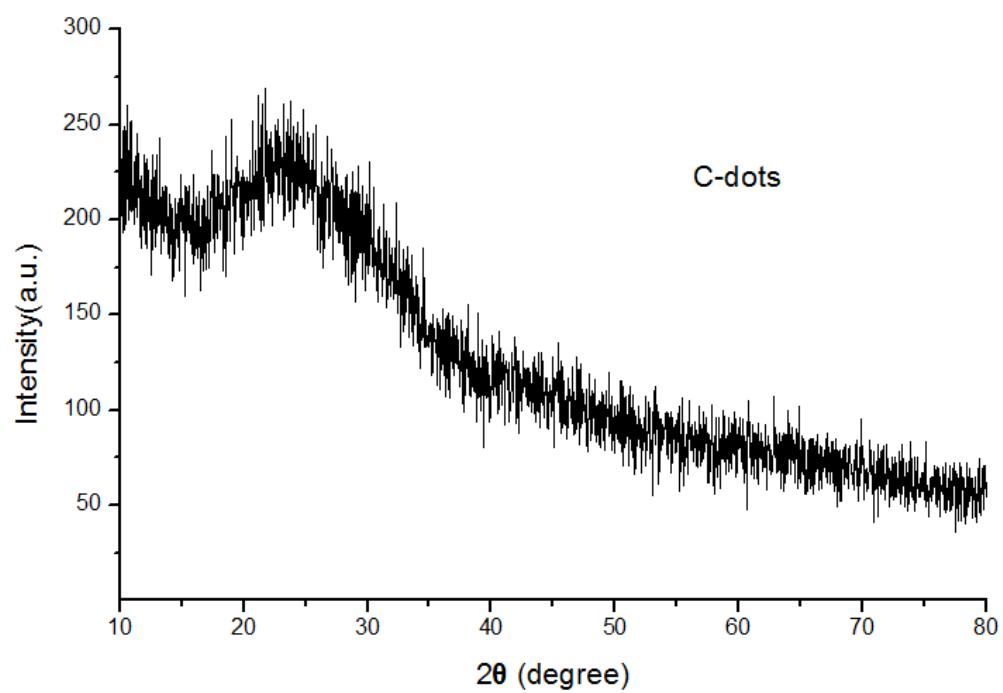


Figure S2. XRD spectrum of C-dots deposited on a glass slide.

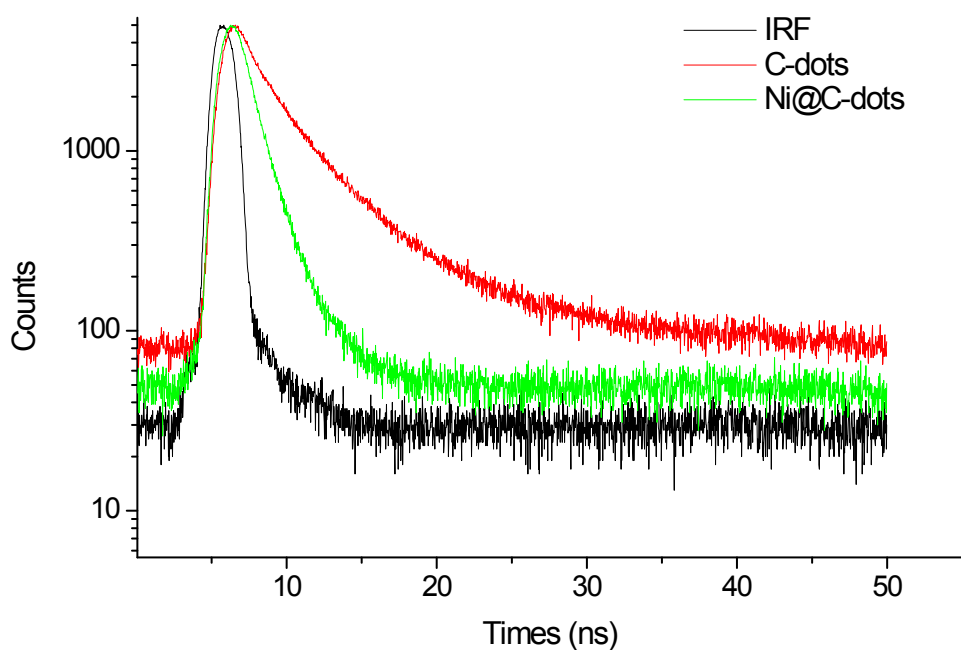


Figure S3. Fluorescence decay profiles ($\lambda_{\text{ex}}=360\text{nm}$ and $\lambda_{\text{em}}=450\text{nm}$) of C-dots and Ni@C-dots aqueous suspension.

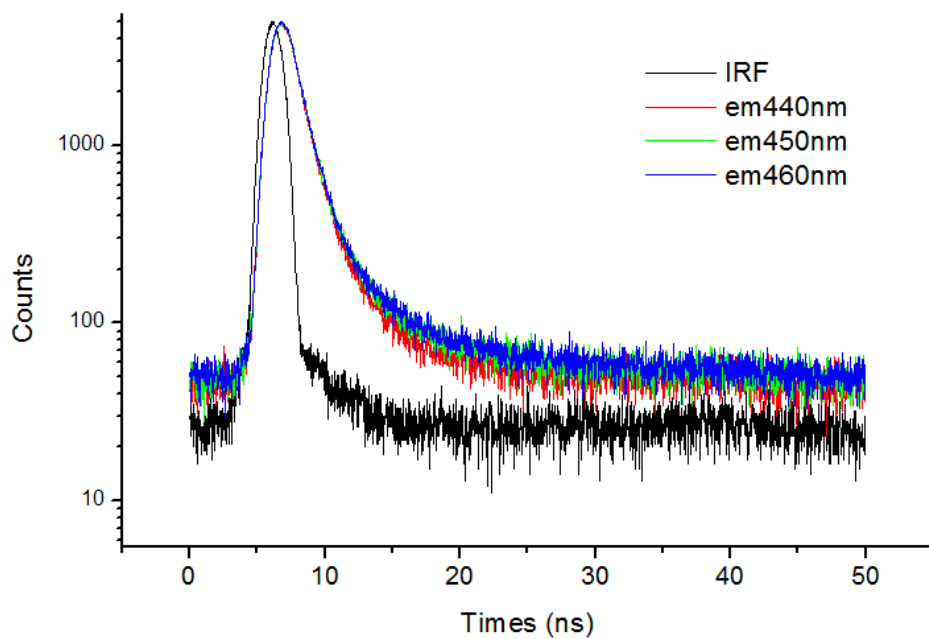


Figure S4. Fluorescence decay profiles of Ni@C-dots aqueous suspension collected at different wavelengths when excited at 330 nm.

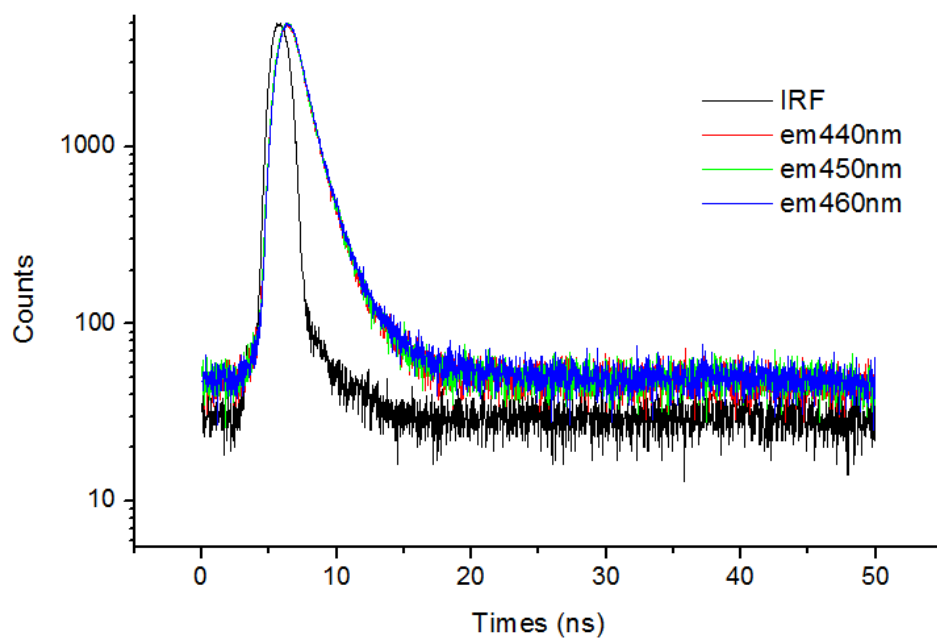


Figure S5. Fluorescence decay profiles of Ni@C-dots aqueous suspension collected at different wavelengths when excited at 360 nm.

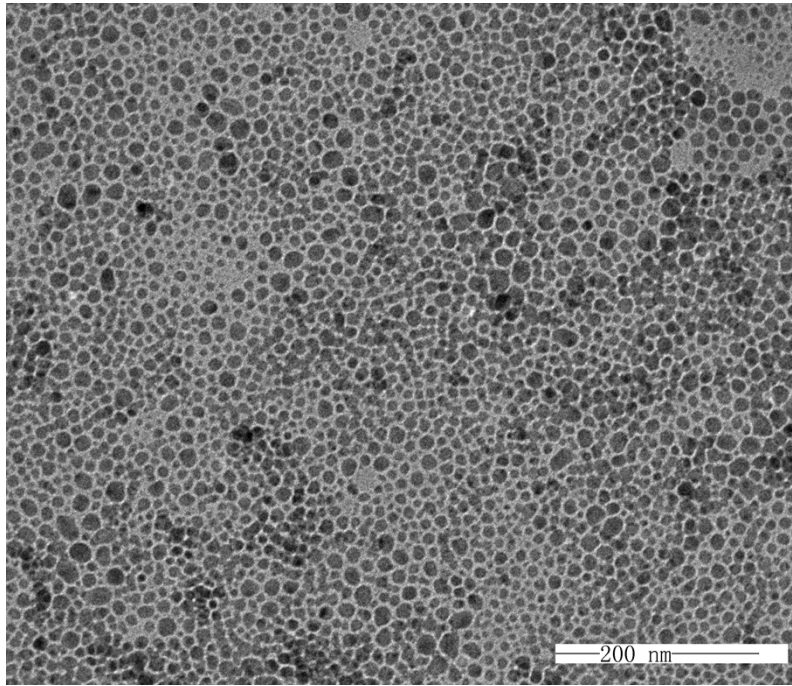


Figure S6. TEM image of Ni NPs

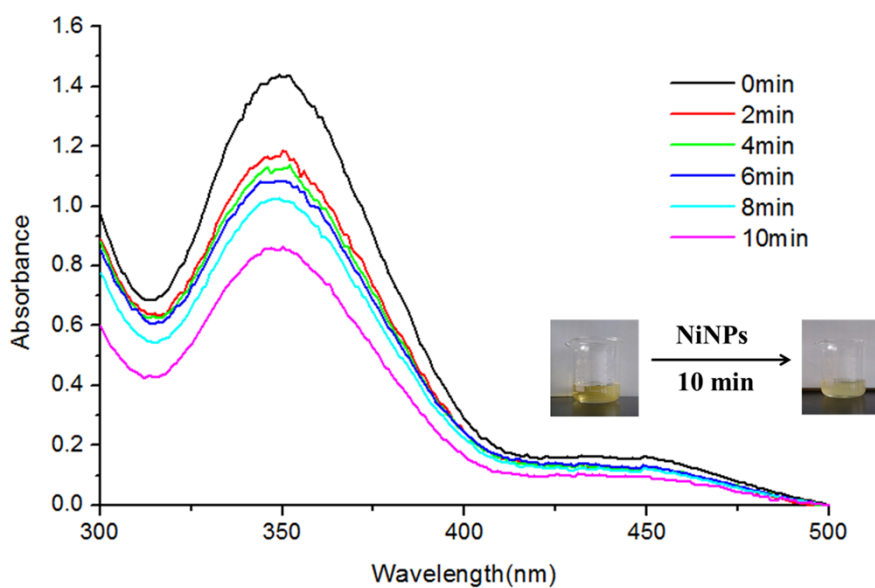


Figure S7. UV–visible spectral evolution with time during the reduction of Cr (VI) by formic acid at room temperature in the presence of bare Ni NPs. Insert was visible color change of Cr (VI) on addition of NiNPs under daylight.

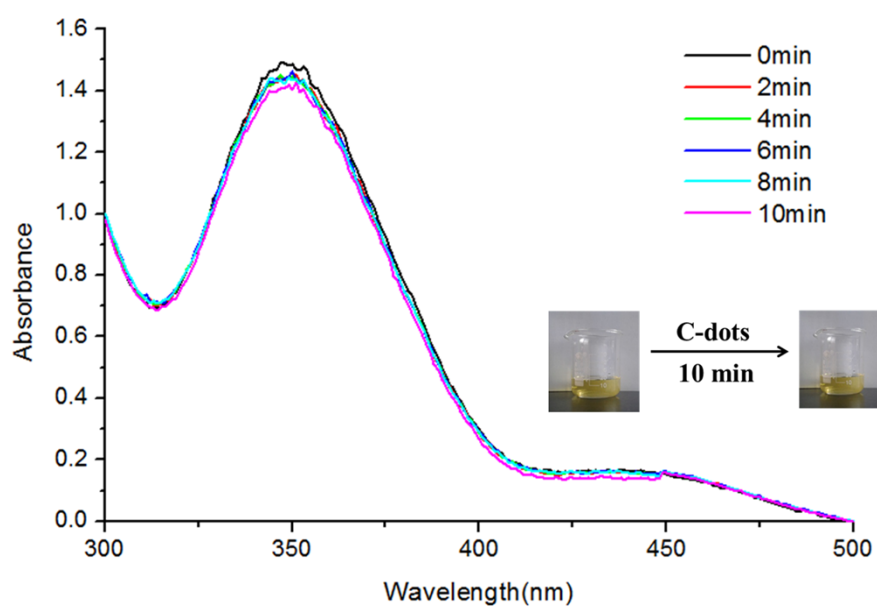


Figure S8. UV–visible spectral evolution with time during the reduction of Cr (VI) by formic acid at room temperature in the presence of pure C-dots. Insert was visible color change of Cr (VI) on addition of C-dots under daylight.