

Resonance Raman Detection and Estimation in the Aqueous Phase using Water Dispersible Cyclodextrin: Reduced-Graphene Oxide Sheets

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Supporting Information

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S1. Resonance Raman spectra of aqueous Pyrene solutions of differing concentrations on addition of β -CD: rGO.

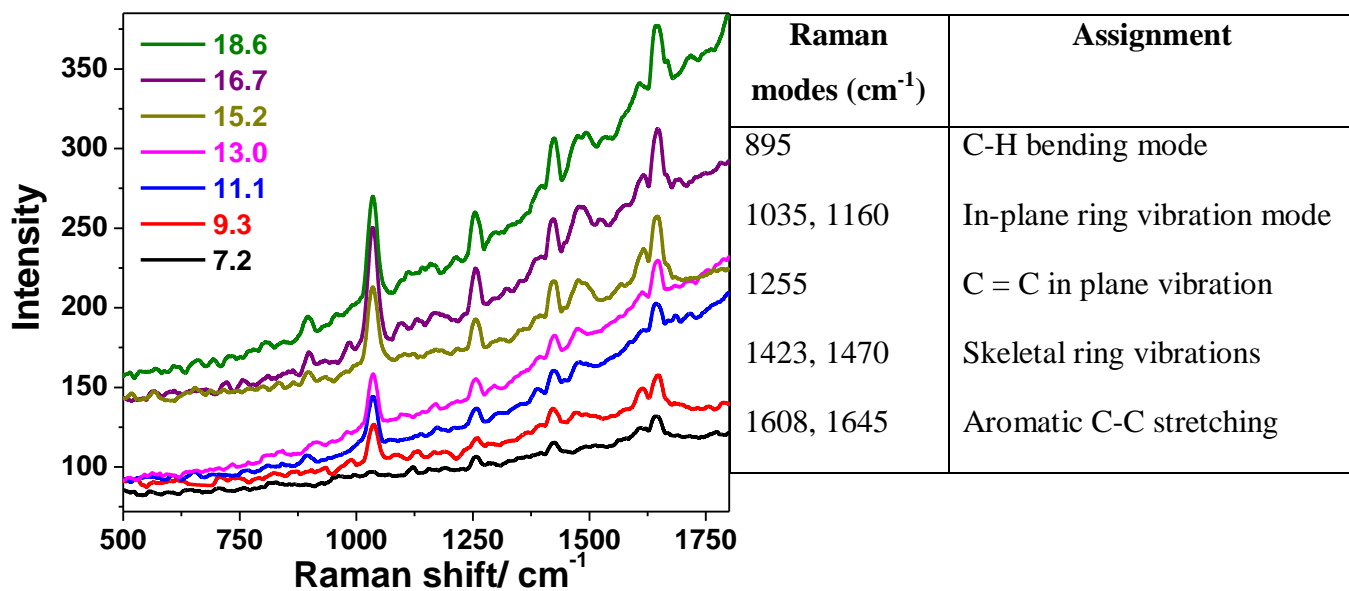


Figure S1. Resonance Raman ($\lambda = 325\text{nm}$) spectra of pyrene aqueous solutions of differing concentrations in the presence of β -CD: rGO. Each of the spectra were recorded after addition of 0.0625 mg of β -CD: rGO per each ml of the pyrene solution. The concentrations (μM) are indicated in the figure. The assignments of the Raman bands of pyrene¹ are indicated in the table.

S2. Resonance Raman spectra of aqueous Rhodamine-6G solutions of differing concentrations on addition of β -CD: rGO.

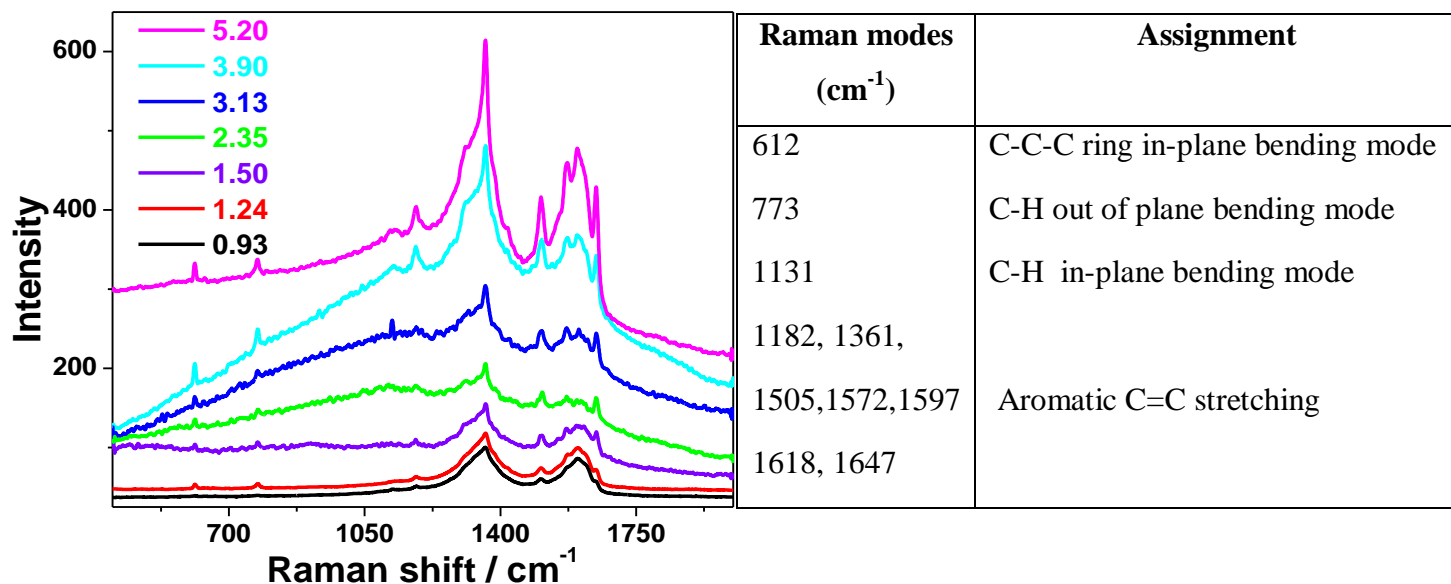


Figure S2. Resonance Raman ($\lambda = 514\text{nm}$) spectra of Rhodamine-6G aqueous solutions of differing concentrations in the presence of β -CD: rGO. Each of the spectra were recorded after addition of 0.0625 mg of β -CD: rGO per each ml of the Rhodamine-6G solution. The concentrations (μM) are indicated in the figure. The assignments of the Raman bands of Rhodamine 6G² are indicated in the table.

S3. Resonance Raman spectra of aqueous Nile Red solutions of differing concentrations on addition of β -CD: *r*GO.

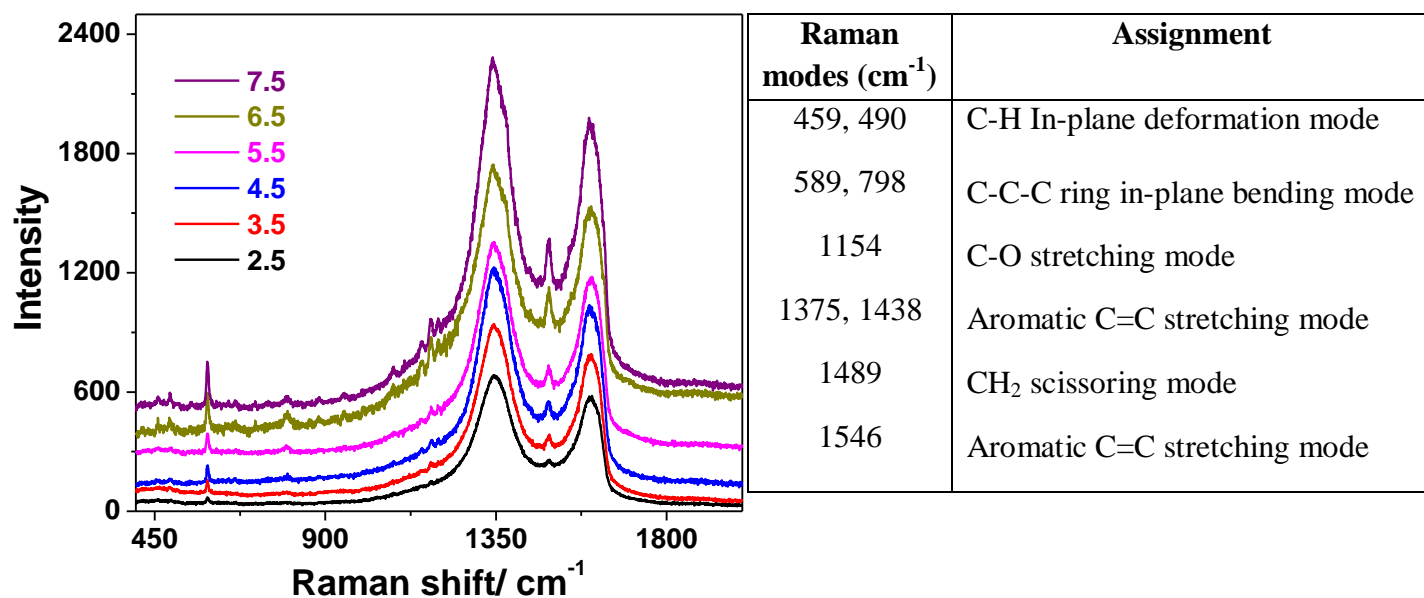


Figure S3. Resonance Raman ($\lambda = 514\text{nm}$) spectra of Nile Red aqueous solutions of differing concentrations in the presence of β -CD: *r*GO. Each of the spectra were recorded after addition of 0.0625 mg of β -CD: *r*GO per each ml of the Nile Red solution. The concentrations (μM) are indicated in the figure. The assignments of the Raman bands of Nile Red³ are indicated in the table.

S4. Resonance Raman spectra of aqueous Sudan Red solutions of differing concentrations on addition of β -CD: rGO.

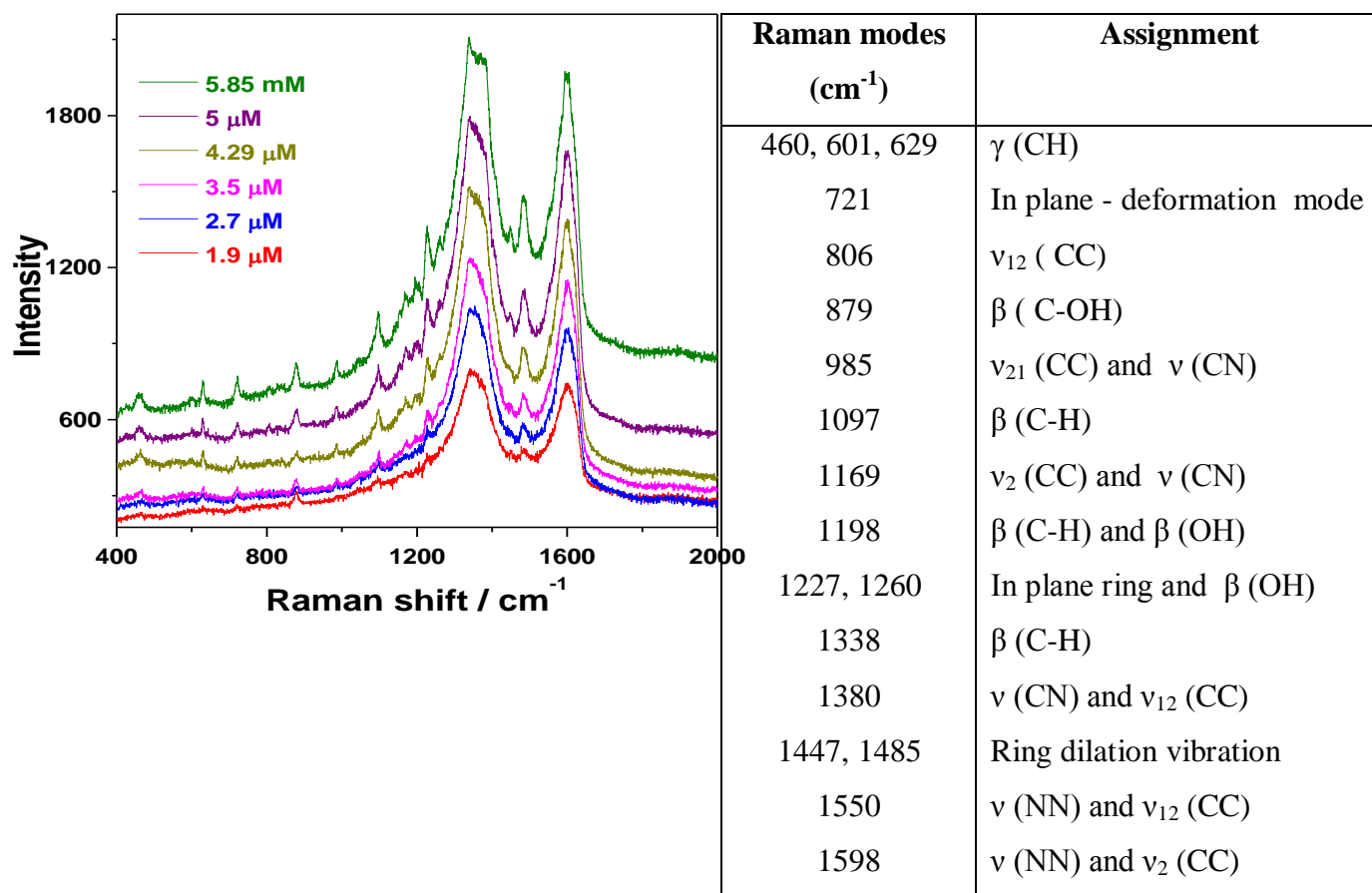


Figure S4. . Resonance Raman ($\lambda = 514\text{nm}$) spectra of Sudan Red aqueous solutions of differing concentrations in the presence of β -CD: rGO. Each of the spectra were recorded after addition of 0.0625 mg of β -CD: rGO per each ml of the Sudan Red solution. The concentrations (μM) are indicated in the figure. The assignments of the Raman bands of Sudan red⁴ are indicated in the table.

S5. Resonance Raman spectra of aqueous azobenzene solutions of differing concentrations on addition of β -CD: rGO.

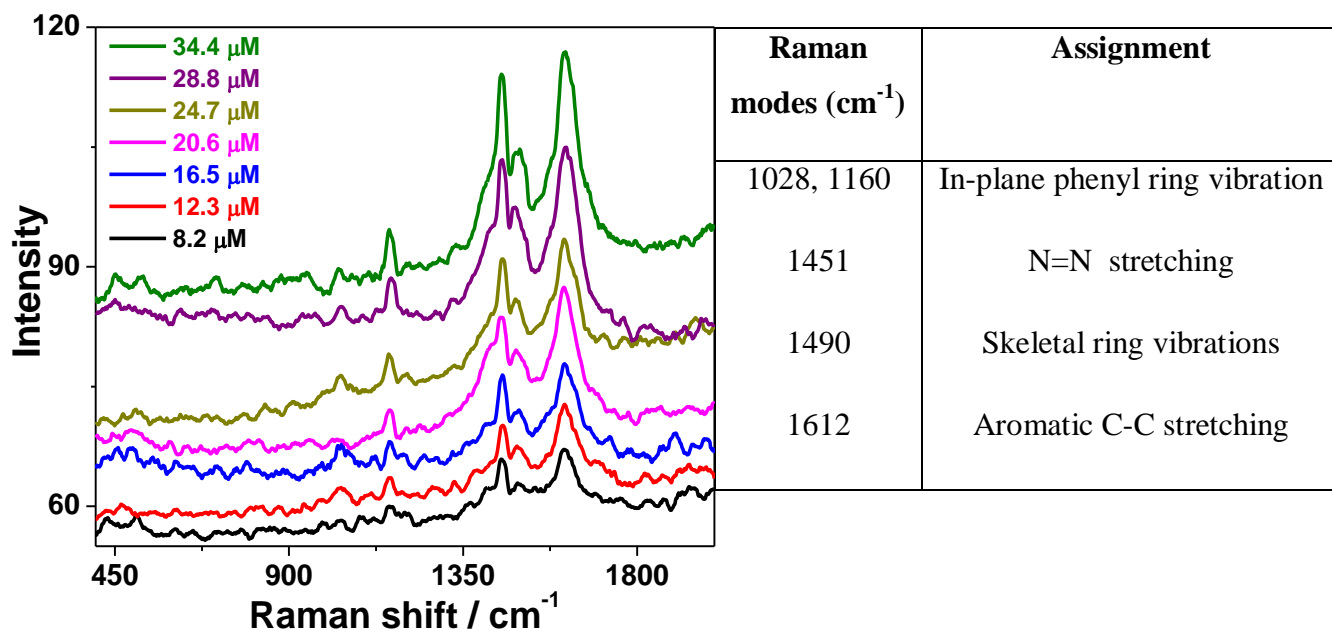


Figure S5. Resonance Raman ($\lambda = 325$ nm) spectra of *trans* azobenzene aqueous solutions of differing concentrations in the presence of β -CD: rGO. Each of the spectra were recorded after addition of 0.0625 mg of β -CD: rGO per each ml of the azobenzene solution. The concentrations (μ M) are indicated in the figure. The assignments of the Raman bands of azobenzene⁵ are indicated in the table.

S6. Comparison of the resonance Raman spectra of β -CD: rGO in the absence and presence of dye molecules.

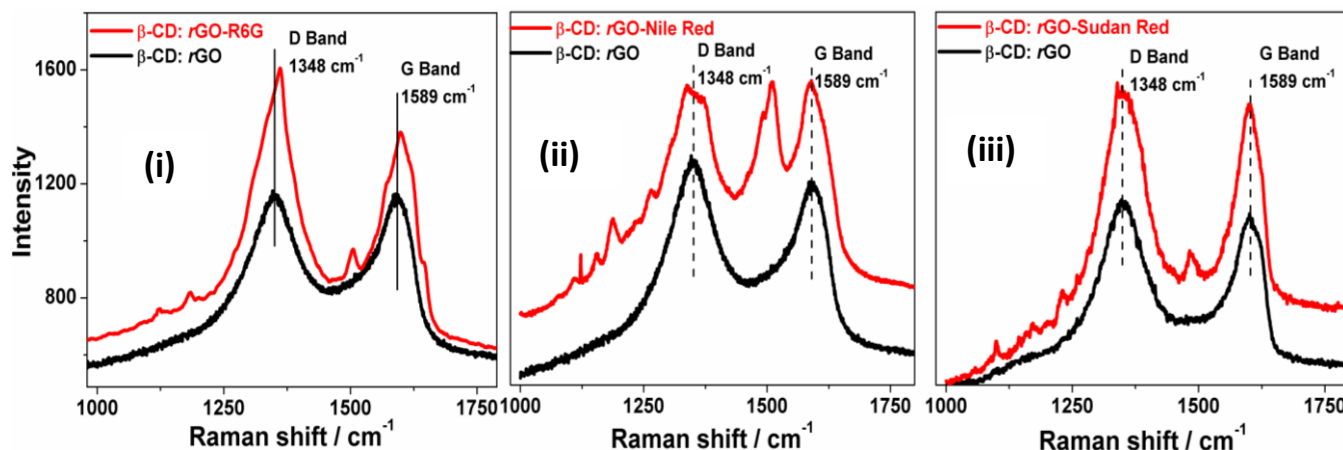


Figure S6. Comparison of the resonance Raman spectra of β -CD: rGO in the absence (black line) and presence of the dye molecule (red line). The concentration of β -CD: rGO is 0.0625mg/mL (i) β -CD: rGO-Nile Red inclusion complex. The concentration of Nile Red used for the measurements is 6.5 μ M. (ii) β -CD: rGO-Sudan Red inclusion complex. The concentration of Sudan Red used for the measurements is 3.5 μ M. (iii) R6G adsorbed on β -CD: rGO. The concentration of R6G used for the measurements is 0.93 μ M.

REFERENCES

- (1) Jones, C. M.; Asher, S. A. *J. Chem. Phys.* **1988**, 89, 2649.
- (2) Xie, L.; Ling, X.; Fang, Y.; Zhang, J.; Liu, Z. *J. Am. Chem. Soc.* **2009**, 131, 9890.
- (3) Charan, S.; Chien, F.-C.; Singh, N.; Kuo, C.-W.; Chen, P. *Chem. Eur. J.* **2011**, 17, 5165.
- (4) Xiaofang, Z.; Fang, Y.; Zhang, P. X. *Trends in Applied Sci. Res.* **2006**, 1, 155.
- (5) Barker, I. K.; Fawcett, V.; Long, D. A. *J. Raman Spectrosc.* **1987**, 18, 71.