

Coffee Grounds-Derived CNPs for Efficient Cr(VI) Water Remediation

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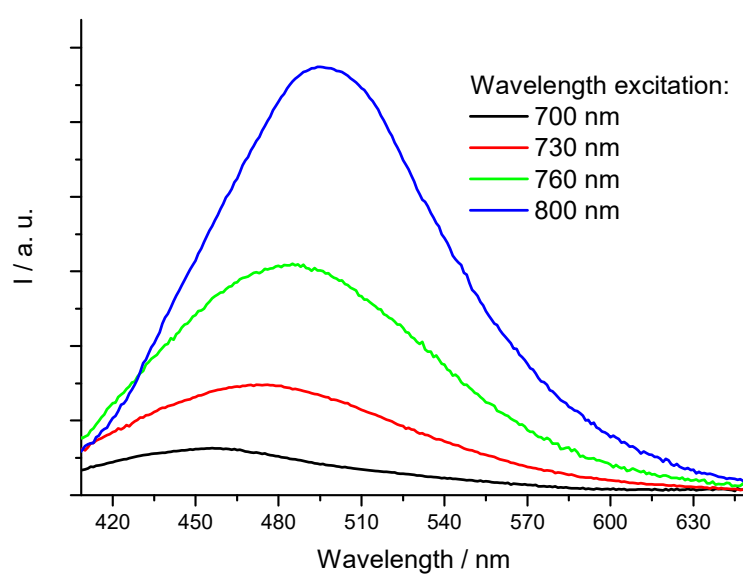


Figure S1. Up-conversion fluorescence recorded at different excitation wavelengths.

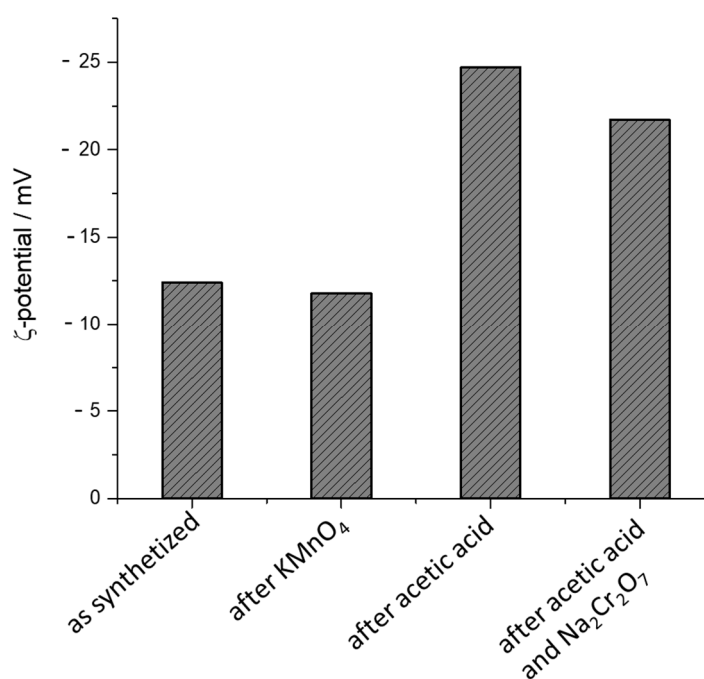


Figure S2. ζ-potential performed on the as-synthesized CNPs, after the interaction KMnO_4 , after acetic acid (1h at pH4.5) exposure and after acetic acid and dichromate interaction (1h at pH4.5).

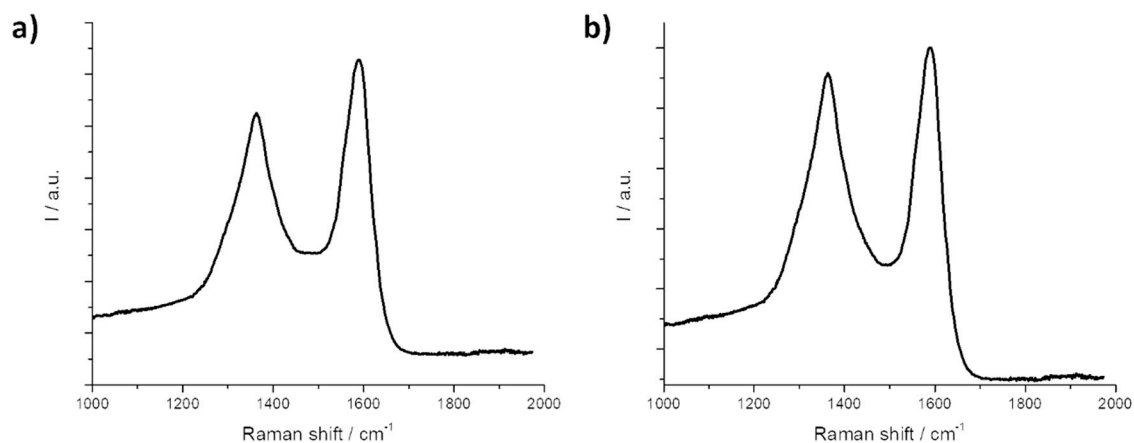


Figure S3. a) Raman spectrum of CNPs after interaction with the chromate/dichromate solution (10^{-4} M); b) Raman spectrum of CNPs after interaction with KMnO_4 solution (10^{-4} M).

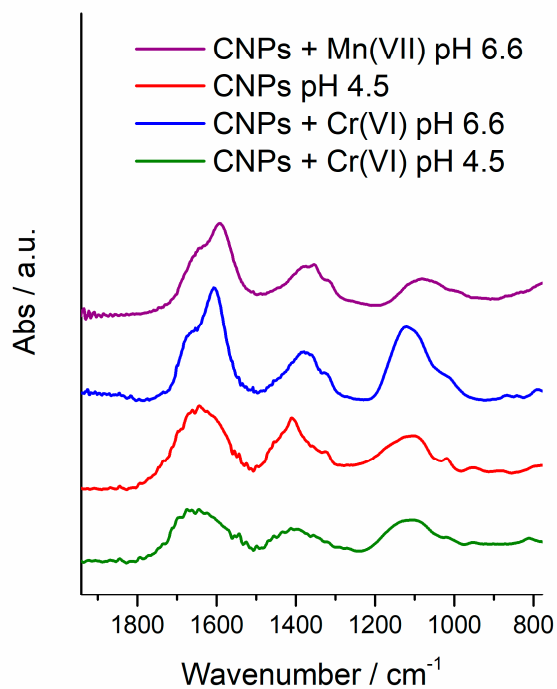


Figure S4. FT-IR (in the $1850\text{--}800\text{ cm}^{-1}$ range) spectra of CNPs in presence of Mn(VII) at pH 6.6 (purple line), in presence of Cr(VI) at pH 6.6 (blue line), treated at pH 4.5 (red line), in presence of Cr(VI) at pH 4.5 (green line).

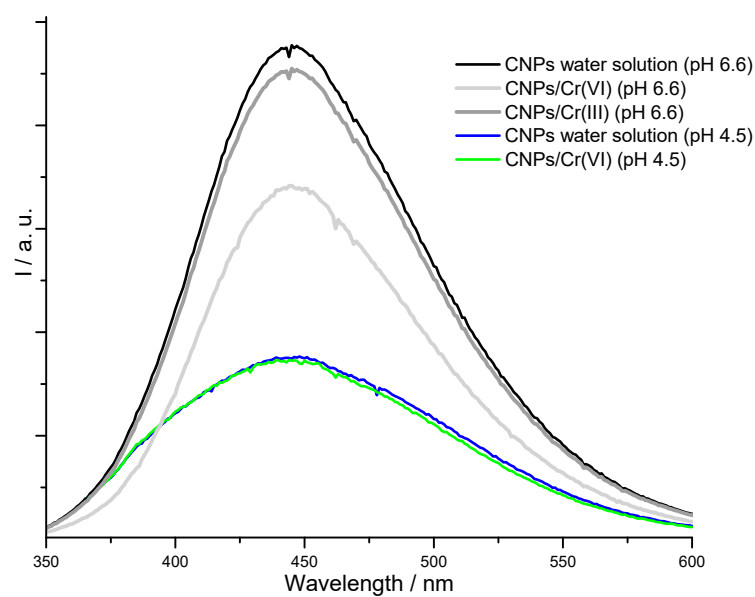


Figure S5. Down conversion fluorescence of CNPs at two different pH values and in presence of Cr(VI) and Cr(III).

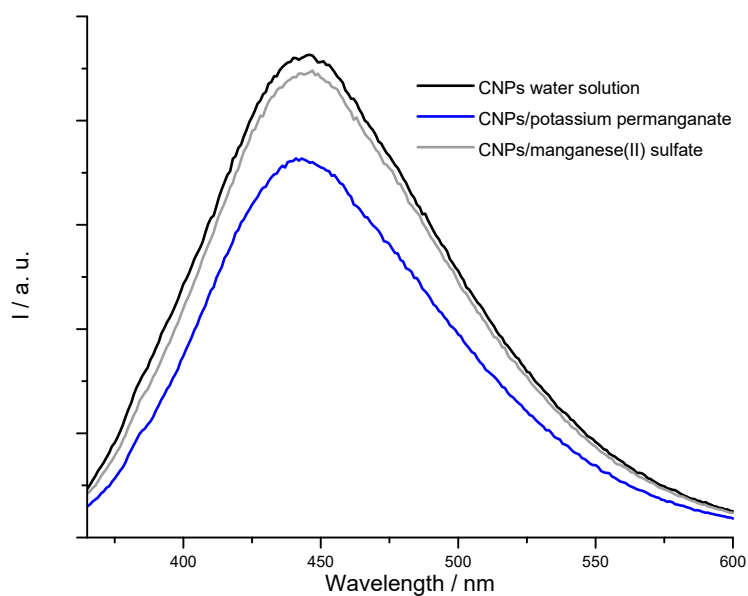


Figure S6. Down conversion fluorescence of CNPs and in presence of potassium permanganate and manganese(II) sulphate.