Electronic Supplementary Information

Carbon dots with red emission as nanoprobe for sensing of heparin in biofluids and pharmaceutical samples

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Section S.2.1.

Neutral red (NR), thiourea and all other reagents with the analytical grade were purchased from Merck or Sigma Aldrich companies. Heparin sodium salt (190 units IU mg^{-1}) was purchased from Qingdao Jiulong Biopharmaceutical Co., Ltd (QJBC, China) and its molecular weight was estimated (719 g mol^{-1}). Heparin sodium injection (5000 IU, Aburaihan Pharmaceutical Company, Iran) was purchased from local pharmacy in Tehran city. Several human biofluids, including urine, serum samples as the real samples were obtained from the Imam Khomeini Hospital at Tehran city. Phosphate buffer (PB) were prepared from their salts as the media solutions. Milli-Q grade deionized (DI) water with a resistivity of 18.2 MΩ was used for all tests. The pH adjustment of buffers was carried out on a pH meter (Metrohm pH meter 827) with a combined glass calomel electrode. FT-IR spectra were recorded on a Jasco 460 FT-IR spectrometer from 400 to 4000 cm^{-1} using KBr pellets. The surface morphology, and the size of the nanoparticles were evaluated by Field emission scanning electron microscopy (FESEM: TESCAN/MIRA3) instrument equipped with EDX analyzer and Transmission electron microscopy (TEM: PHILIPS EM 208,100 kv). Fluorescent measurements are performed on a FS-5 spectrophotometer (Edinburgh, UK) and the slit width is set as 5.2 nm for excitation and emission, respectively. UV absorption spectra were obtained by a UV-Vis spectrometer (Jasco 730, Japan).