

Supplementary Information for

Electrochemistry and surface-enhanced Raman spectroscopy of CTAB modulated interactions of magnetic nanoparticles with biomolecules

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Synthesis of MNPs

Bare MNPs were synthesized by co-precipitation method using 2:1 mole ratio of ferric chloride (6 g) and ferrous chloride (2.1 g) dissolved in 100 ml deionized water. The reaction solution was raised to 80 °C in a nitrogen environment with continuous mechanical stirring. After 30 min, the pH of the solution was increased using aqueous ammonia with simultaneous increase in stirring speed to obtain a black precipitate and the mixture was further kept for another 30 min for digestion. The precipitate mixture of magnetic iron oxide nanoparticles was rinsed 5 – 6 times with DI water and decanted using a permanent bar magnet and further vacuum dried at 45 °C.

Characterization of MNPs

The structural and size analyses of synthesized bare MNPs were carried out using XRD, FTIR, and TEM techniques. The FTIR spectrum featured strong Fe–O vibration band at 580 cm⁻¹ characteristic of magnetite nanoparticles (Fig. S1 A). TEM analysis of MNPs showed an average

size of 10.6 nm (Fig. S1 B). XRD pattern of MNPs sample exhibited well resolved peaks for crystalline iron oxide with cubic structure (Fig. S1 C).

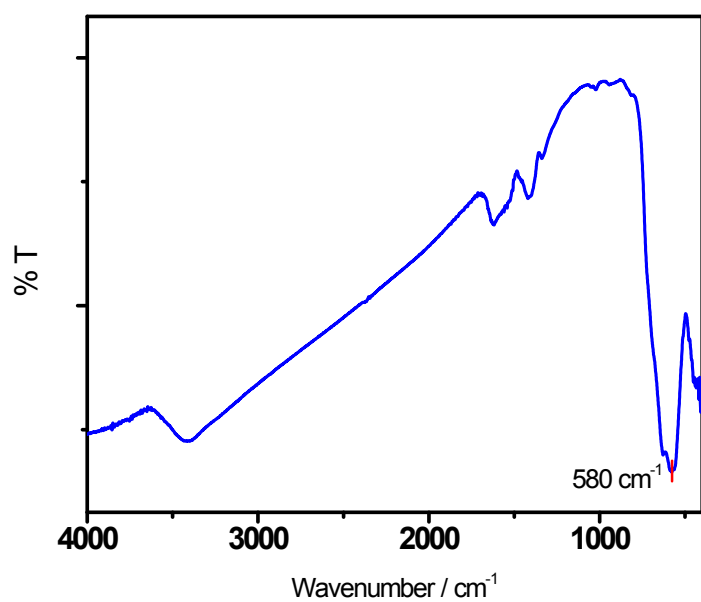


Fig. S1 A: FTIR spectrum showing Fe–O band at 580 cm⁻¹

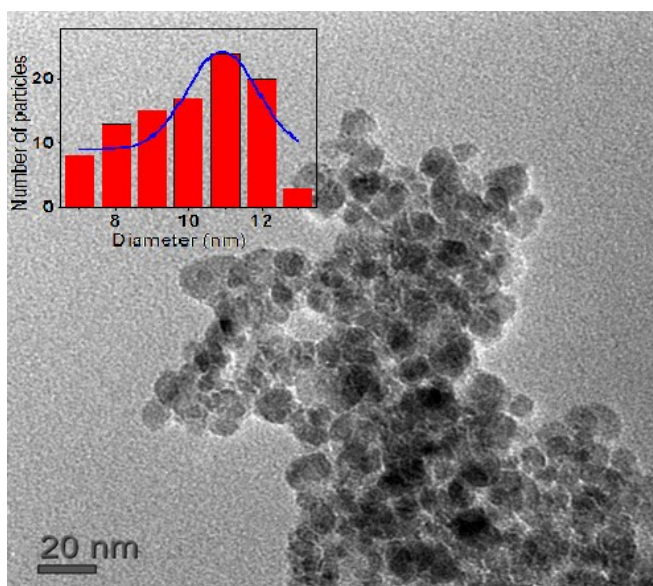


Fig. S1 B: TEM image of bare MNPs and inset: particle size distribution showing an average size of 10.6 nm

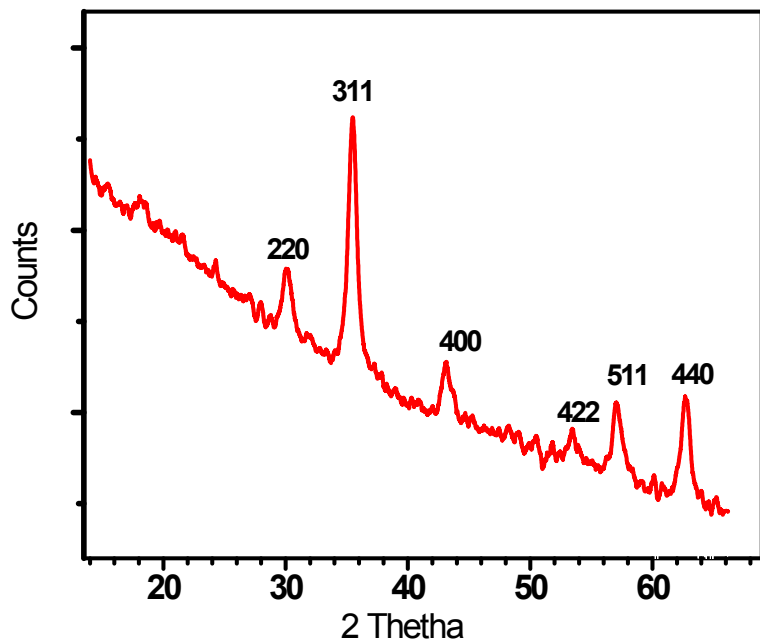


Fig. S1 C: XRD spectra of Magnetite nanoparticles (JCPDS card no. 00-001-1111)

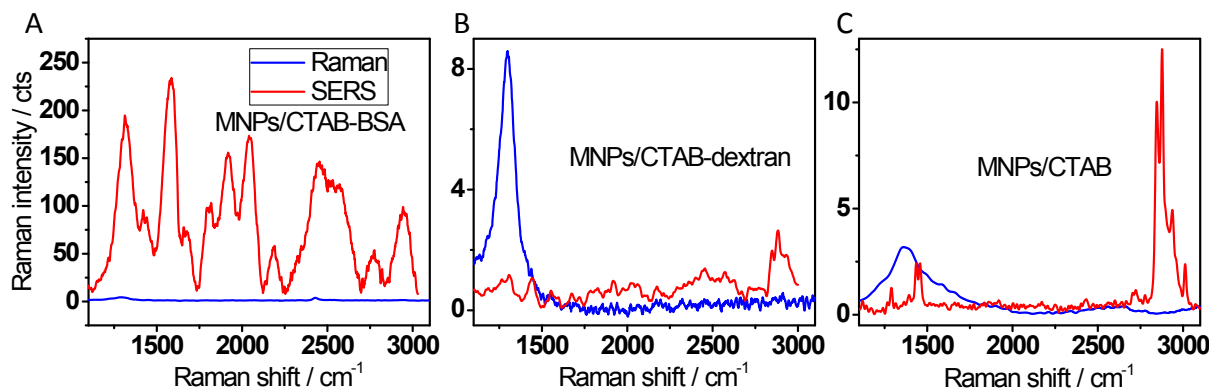


Fig. S2: Comparison of Raman and SERS spectra for (A) MNPs/CTAB-BSA, (B) MNPs/CTAB-dextran, and (C) MNPs/CTAB