

Supporting Information

**Growth of gold nanorods in solution and on ITO and Au substrates using non-peripheral amine functionalized nickel(II) phthalocyanine capped gold nanoparticles as a seed solution**

A. John Jeevagan, M. Amal Raj and S. Abraham John\*

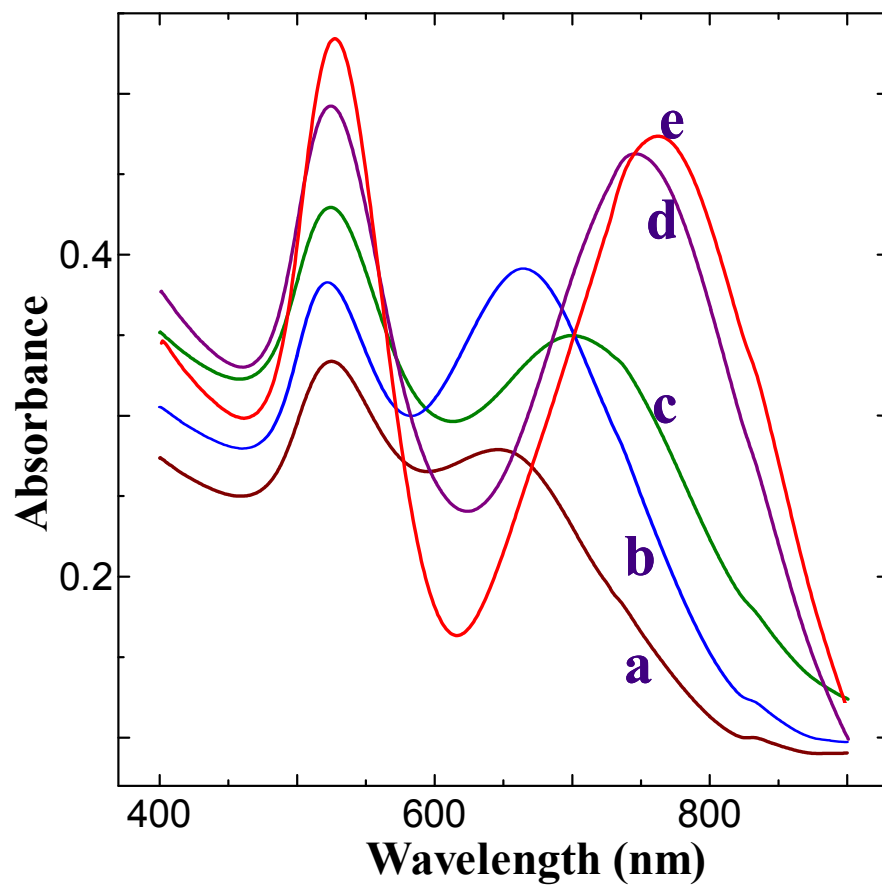
Centre for Nanoscience and Nanotechnology

Department of Chemistry, Gandhigram Rural Institute

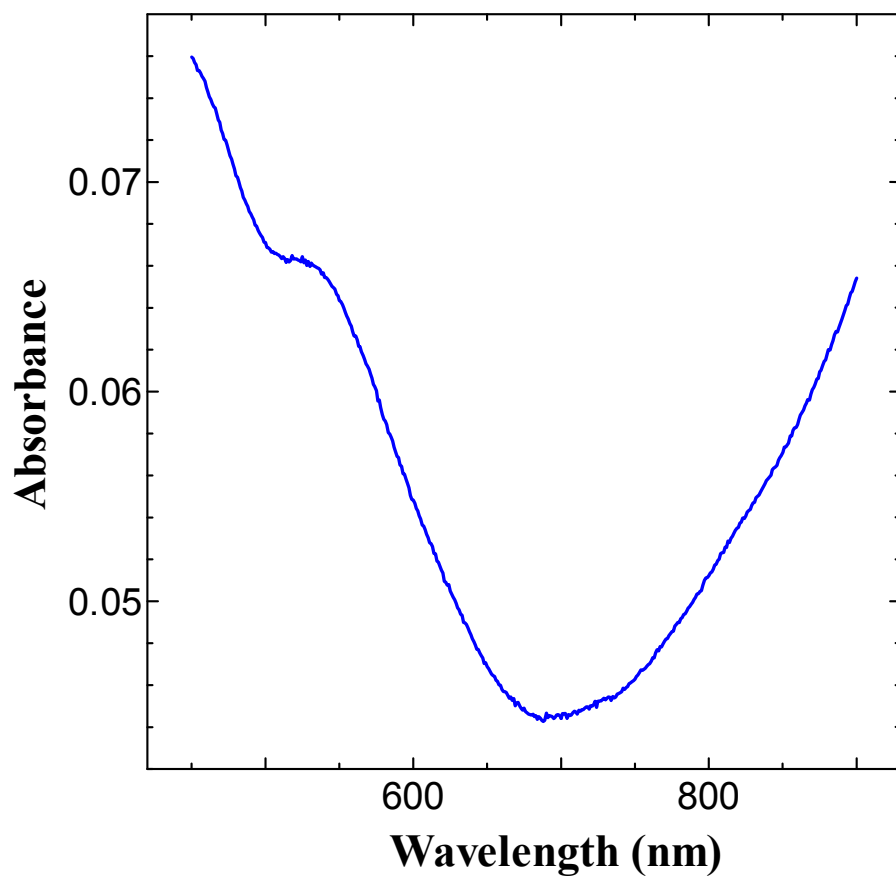
Gandhigram-624 302, Dindigul, India

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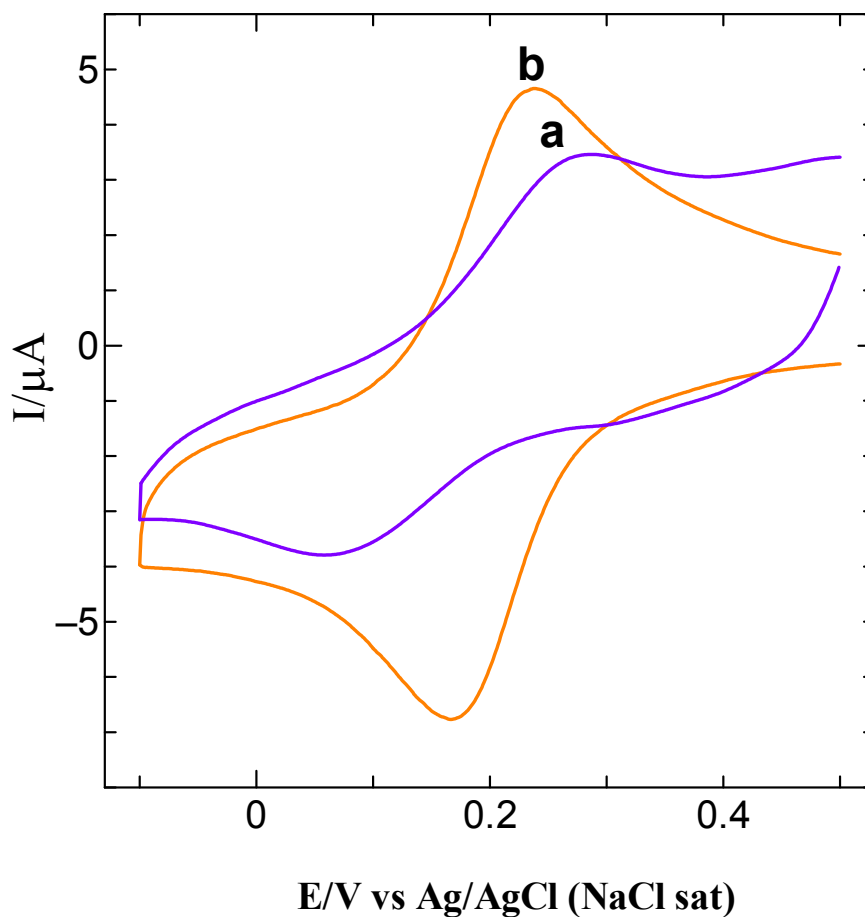
\*To whom correspondence should be addressed. E-mail: [abrajohn@yahoo.co.in](mailto:abrajohn@yahoo.co.in)



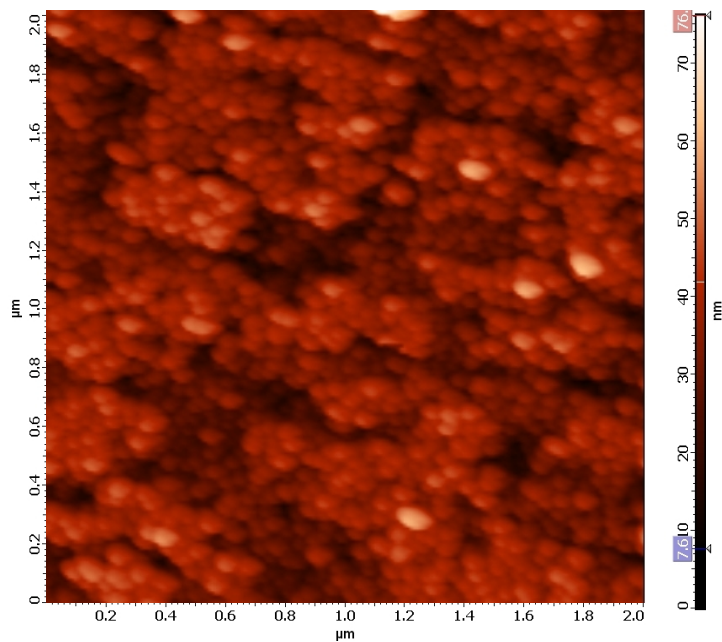
**Figure S1.** UV-vis spectra obtained for the growth of GNRs by different volume of (a) 50 (b) 100 (c) 150 (d) 200 and (e) 250  $\mu\text{L}$  of 0.004 M the silver ion



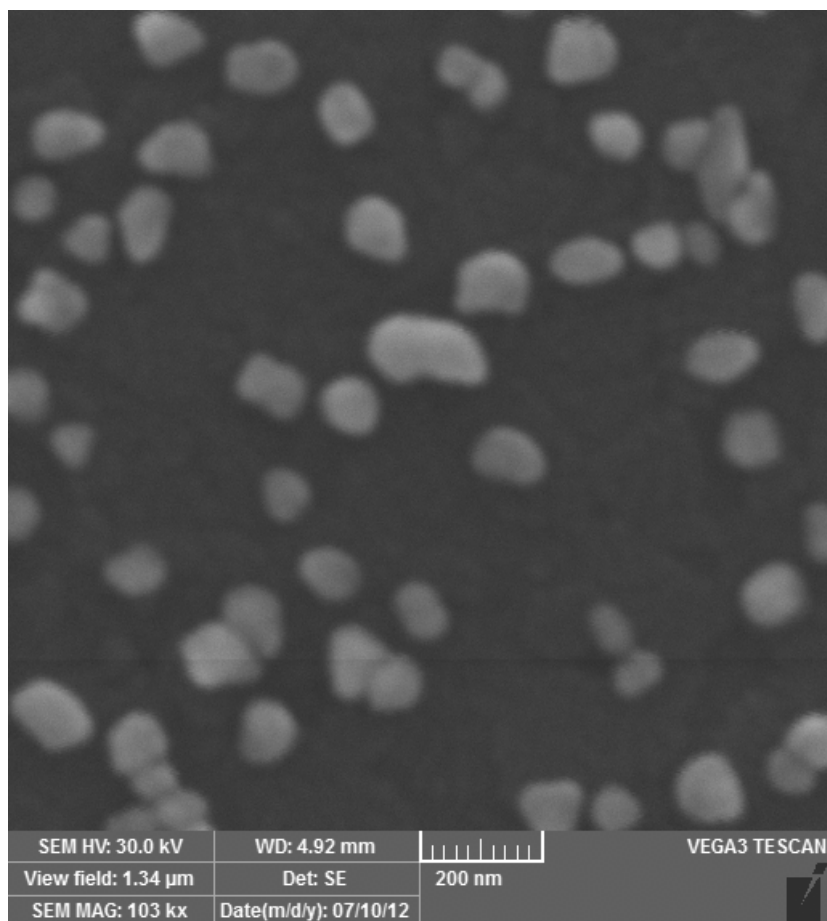
**Figure S2.** UV-vis absorption spectrum of colloidal GNRs directly immobilized on the MPTS sol-gel modified ITO plate.



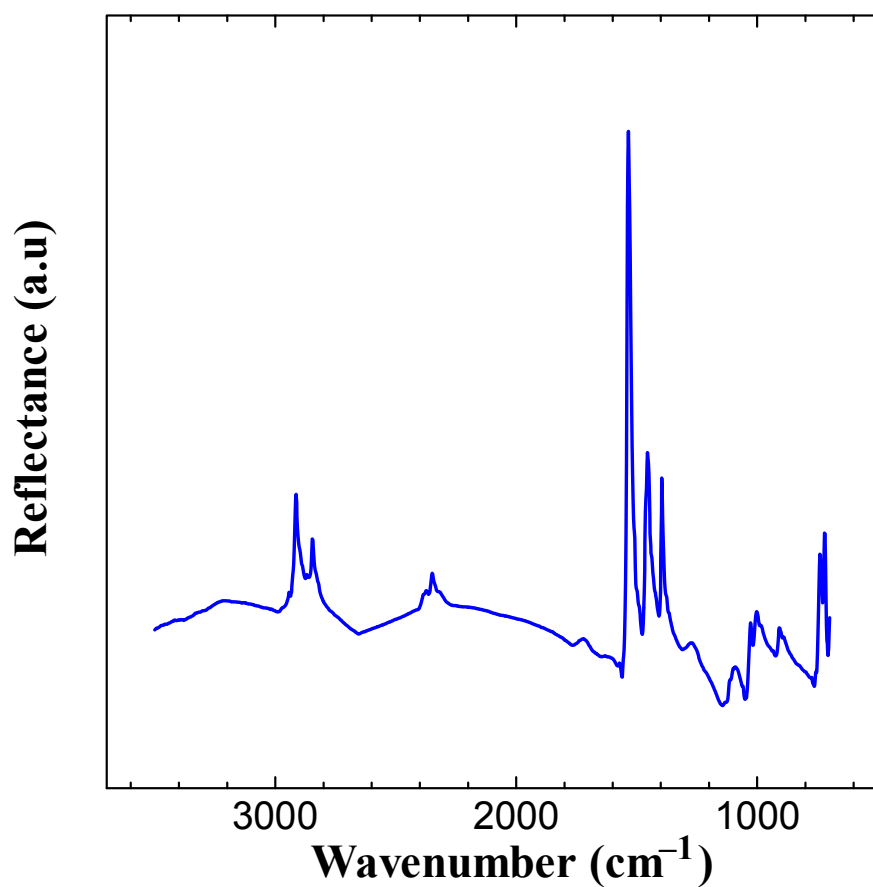
**Figure S3.** CVs obtained for (a) direct attachment of GNRs on Au/MPTS and (b) surface grown GNRs electrodes at a scan rate of  $50 \text{ mV s}^{-1}$  in 0.2 M PB solution (pH=7.2) containing 1 mM  $\text{K}_3[\text{Fe}(\text{CN})_6]$ .



**Figure S4.** AFM image of spherical  $4\alpha\text{-Ni}^{\text{II}}\text{TAPc-AuNPs}$  adsorbed on the MPTS sol-gel film modified ITO plate ( $2 \times 2 \mu\text{m}$ )



**Figure S5.** SEM image of GNRs grown ITO plates



**Figure S6.** ATR-FT-IR spectrum of surface-grown GNRs on the MPTS sol-gel film modified ITO substrate.

**Table S1**

Impedance spectral data

Parameter <sup>a</sup>	Bare Au electrode	Au/MPTS electrode	Au/MPTS/4α-Ni <sup>II</sup> TAPc-AuNPs electrode	Au/MPTS/GNRs electrode
R <sub>s</sub> (kΩ)	0.306 (0.51)	0.212 (0.43)	0.304 (0.87)	0.556 (0.76)
CPE (μF)	3.50 (0.57)	1.05 (0.38)	0.604 (0.77)	0.865 (0.83)
R <sub>CT</sub> (kΩ)	27.14 (0.61)	139.75 (0.35)	34.50 (0.83)	50.53 (0.71)
k <sub>et</sub> (cm s <sup>-1</sup> )	4.92 × 10 <sup>-4</sup>	9.51 × 10 <sup>-5</sup>	3.85 × 10 <sup>-4</sup>	2.63 × 10 <sup>-4</sup>

<sup>a</sup> Percent errors from the fit for each element are given in parentheses.