

Supplementary Data

Facile synthesis of Reduced Graphene Oxide/Pt-Ni nanocatalysts: Its magnetic and catalytic properties

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Results and discussion

XRD pattern of RGO/Ni is shown in Fig. S1 (a). The characteristic (111), (200), (220) peaks for Ni ($2\theta = 44.8$, 52.08 and 76.6) corresponds to face-centered cubic (fcc) nickel (JCPDS 04-0802) and a broad (002) diffraction peak at 2θ of $20\text{--}30^\circ$, which can be interpreted in terms of short range order in stacked graphene sheets. For the bare Pt-Ni, the diffraction peaks at 40.5 , 46.9 , 68.6 and 82.5° are characteristic peaks of the Pt fcc structure. But the peaks are slightly shifted to higher 2θ values as compared to those in RGO/Pt and no characteristic peaks of Ni or its oxides are detected. Further the slight shift of peaks indicates that Ni atoms forms solid solution with Pt and PtNi alloy is formed. According to the Scherrer equation the crystallite sizes of Ni in RGO/Ni and bare Pt-Ni are approximately 62 and 3.6 nm corresponding to the diffraction peak of Ni (111) and bare Pt-Ni (111) respectively.

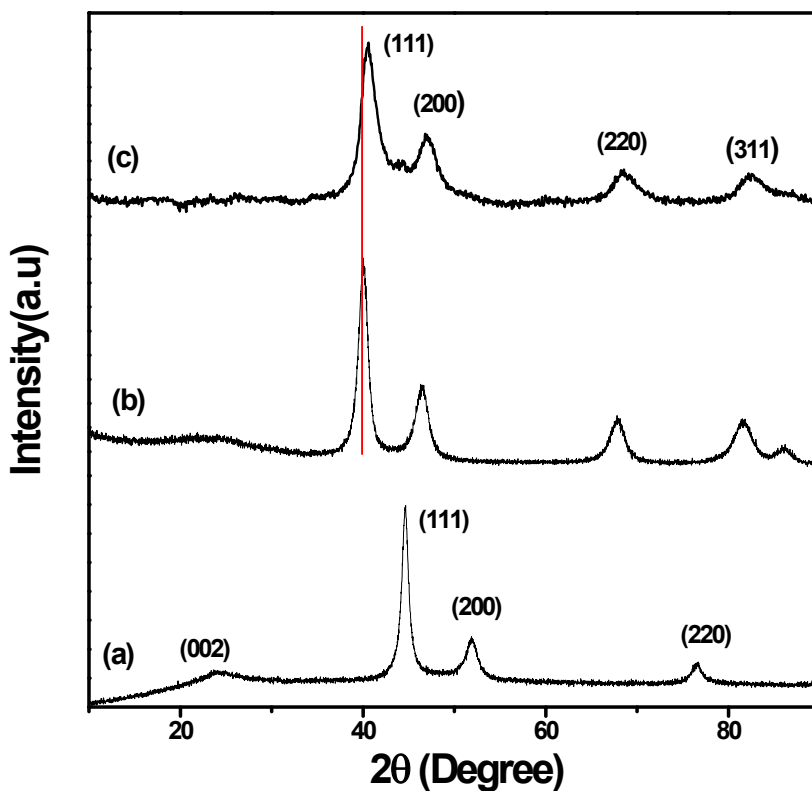


Fig. S1 XRD patterns of (a) RGO/Ni (b) RGO/Pt and (c) bare Pt-Ni of atomic ratio 25:75

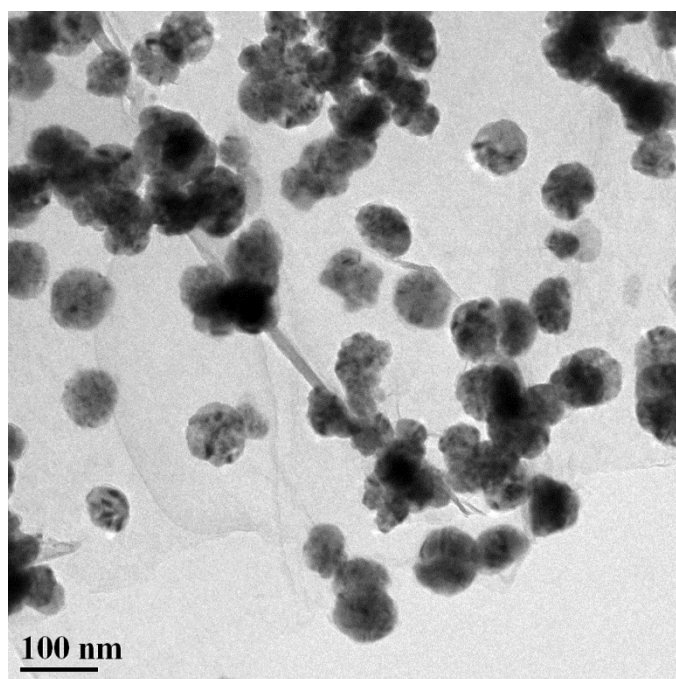


Fig. S2 (a) TEM images of RGO/Ni nanocatalysts

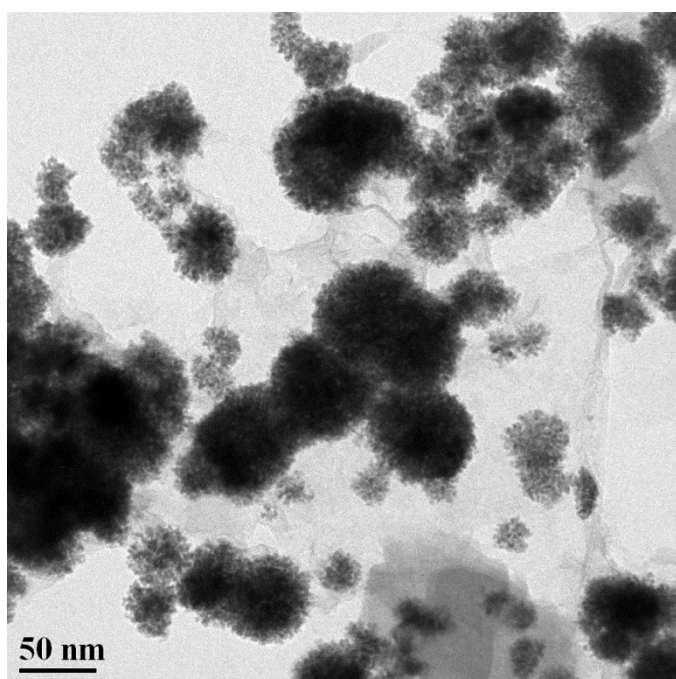


Fig. S2 (b) TEM images of RGO/Pt nanocatalysts

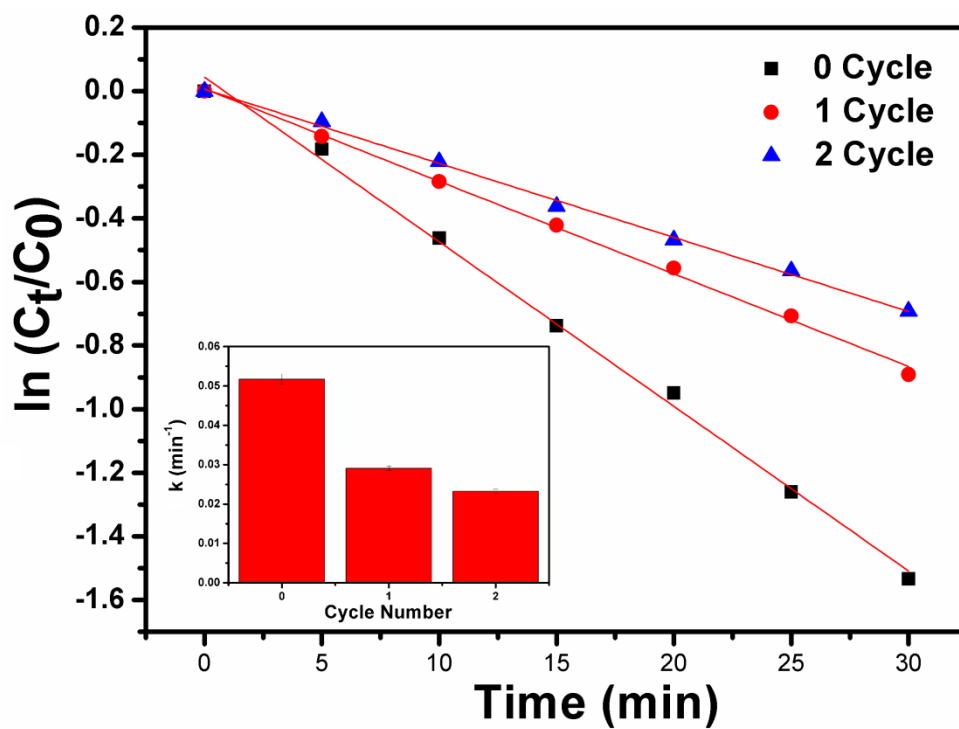


Fig. S3 Plots of $\ln(C_t/C_0)$ of p-nitro phenol versus reaction time for successive 2 cycle reactions employing bare Pt-Ni(25:75) as catalyst. Inset: Value of rate constant (k) for each cycle with bare Pt-Ni (25:75) as catalyst.

Table S1. Room temperature (RT) and Low temperature (LT) magnetic data of the RGO-Pt-Ni nanocatalysts of different atomic ratios

Nanocatalysts	M (at 5 Tesla) (emu g ⁻¹)	M_r (emu g ⁻¹)	H_c (Oe)
RGO/Pt-Ni (25:75)	2.04 (RT)	0.232(RT)	54 (RT)
	15.8 (LT)	3.5 (LT)	482 (LT)
RGO/Pt-Ni (50:50)	1.61 (RT)	0.162 (RT)	40 (RT)
	10.77 (LT)	2.03 (LT)	395 (LT)
RGO/Pt-Ni (75:25)	0.98 (RT)	0.085 (RT)	27 (RT)
	7.02 (LT)	0.73 (LT)	335 (LT)