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Au-Pt Graded Nano-Alloy Formation and Its Manifestation in Small Organics Oxidation Reaction

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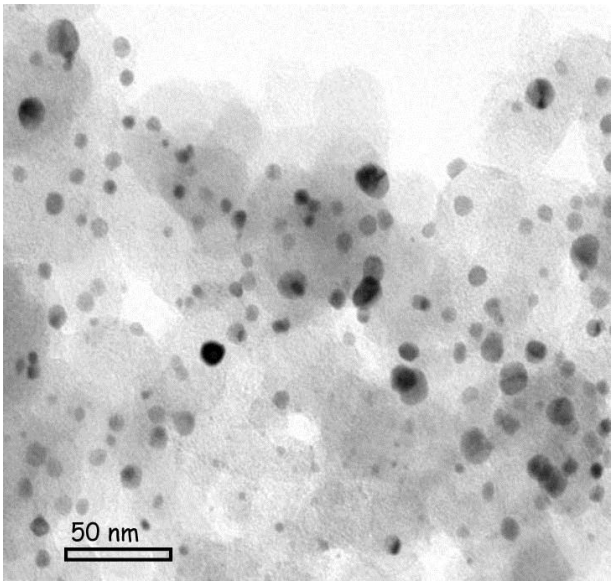

Fig. S1. TEM image of $Au_{60}Pt_{40}$ NPs dispersed on carbon surface.

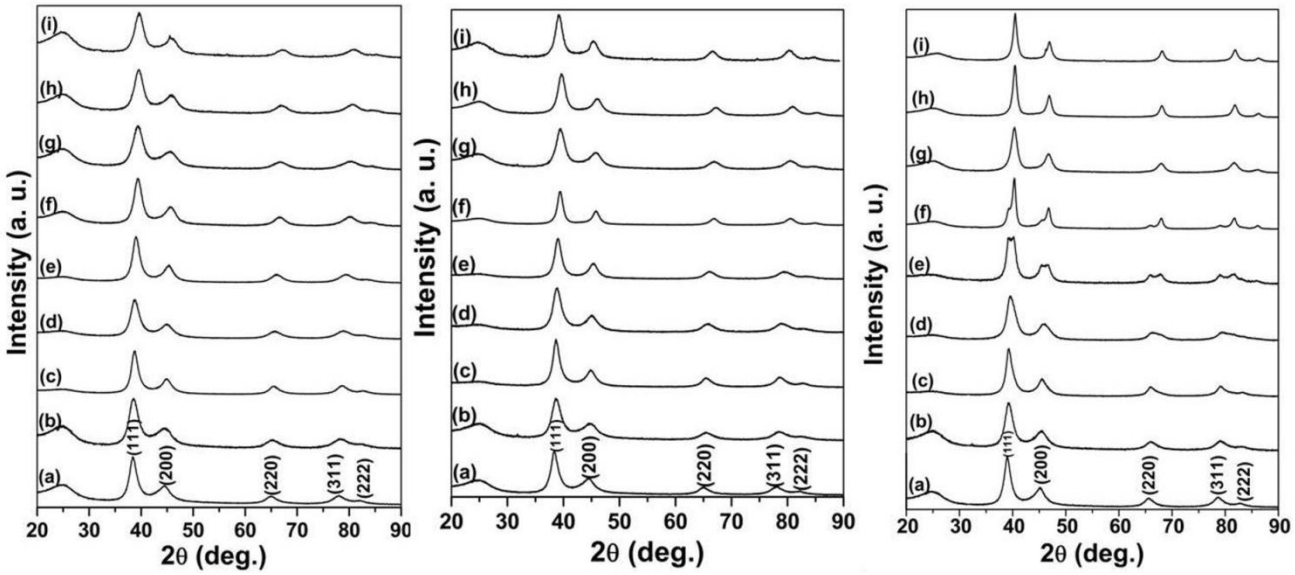

Fig. S2. Powder XRD pattern of $Au_{100-x}Pt_x$, (a) x=7, (b) 14, (c) 23, (d) 32, (e) 40, (f) 51, (g) 62, (h) 73, (i) 86 annealed at (A) 250, (B) 400 and (C) 600 ˚C.

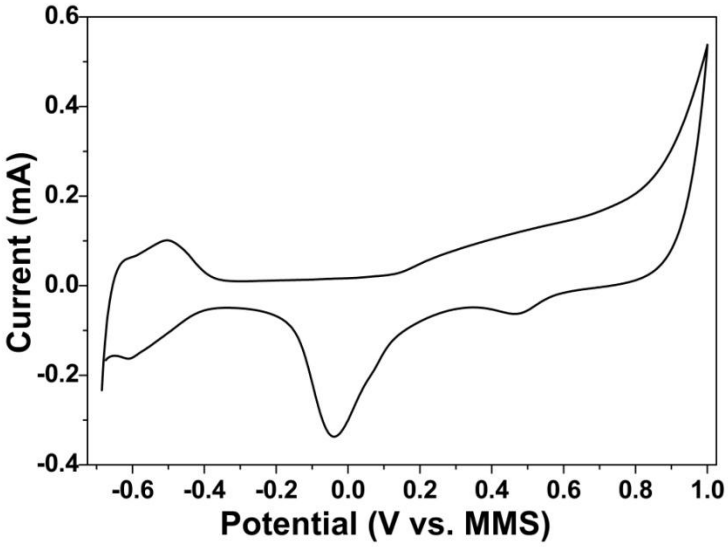

Fig. S3. Cyclic voltammogram of $Au_{60}Pt_{40}$/C in 1.0 N H_2SO_4 using Pt foil counter electrode and a MMS reference electrode at a scan rate of 10 mV/s.

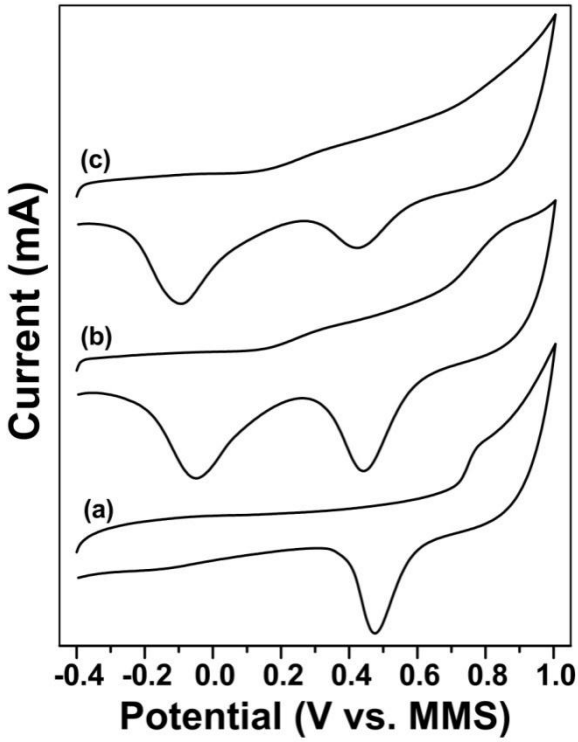

Fig. S4. Cyclic Voltammograms of $Au_{77}Pt_{23}$/C in different synthetic procedures of (a) preformed Pt^0 by $NH_2NH_2.H_2O$ and subsequent reduction of $[AuCl_4]^-$ using $NaBH_4$, (b) Mixture of $NH_2NH_2.H_2O$ and $NaBH_4$, (c) $NaBH_4$ alone. The potentials are with reference to MMS.

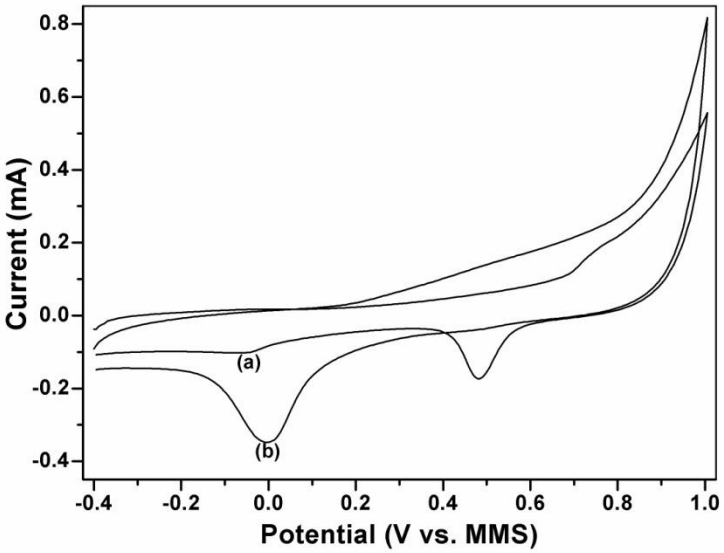

Fig. S5. Cyclic Voltammograms of $Au_{77}Pt_{23}$/C materials synthesized using ascorbic acid as a reducing agent in (a) at room temperature, (b) at 80 ˚C. The potentials are with reference to MMS.

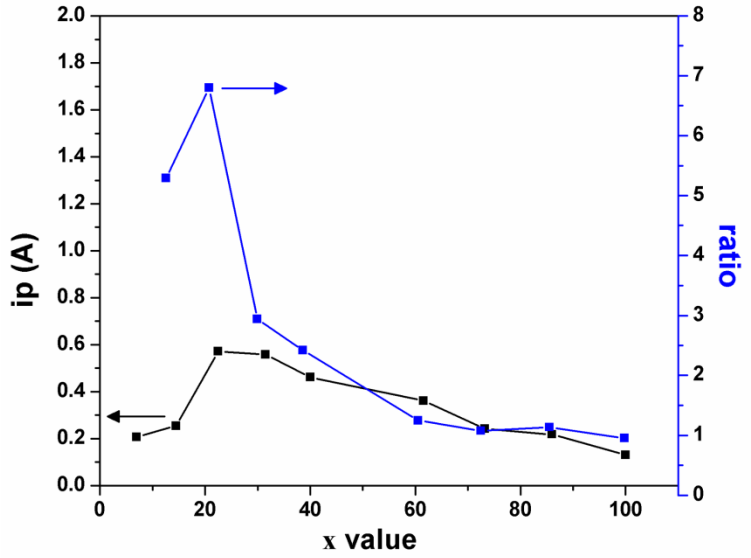

Fig. S6. Plot of peak current values of MOR per mg of Pt in $Au_{100-x}Pt_x$/C catalysts (black line) and i_f/i_b ratio (blue line) *vs*. x values.

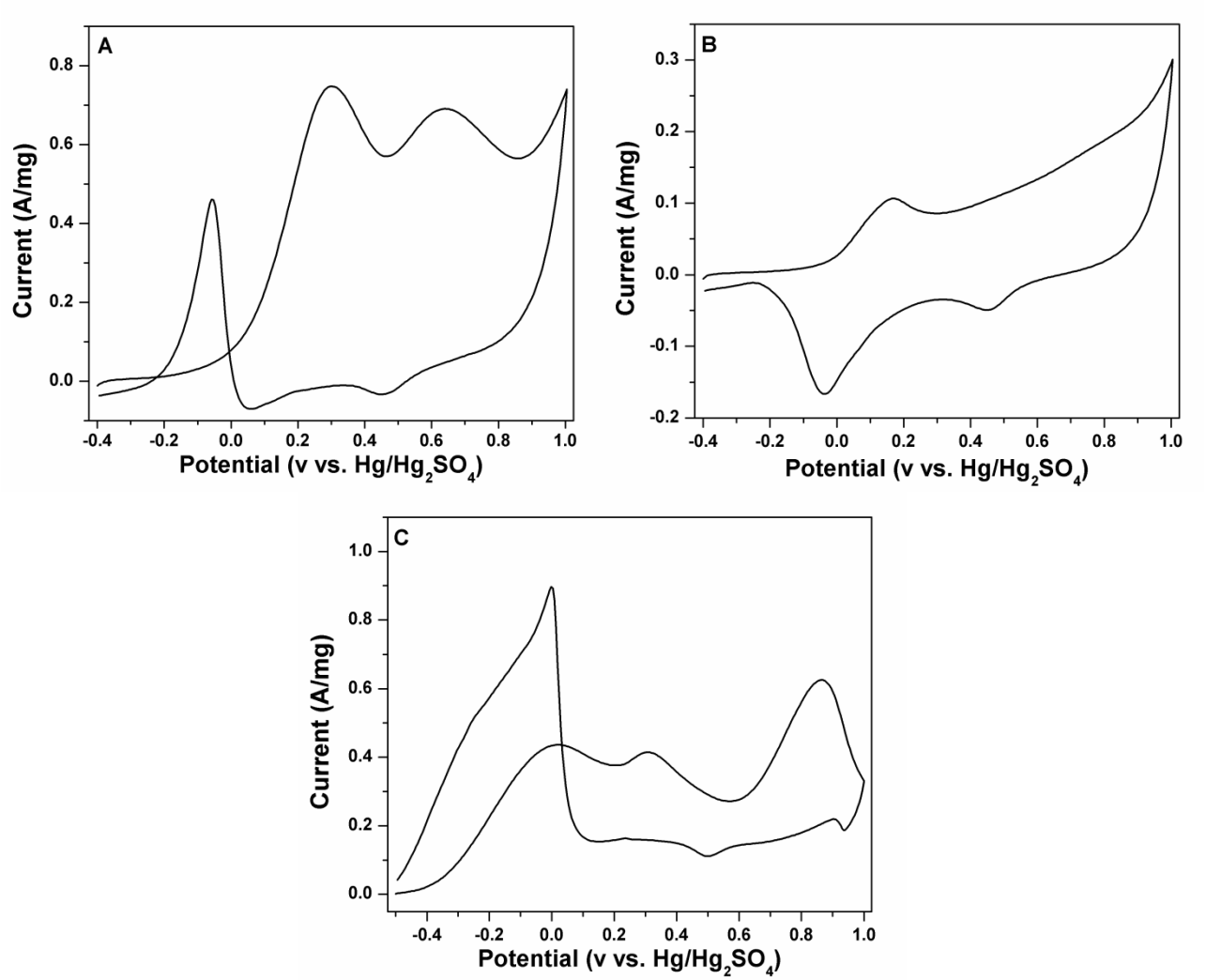

Fig. S7 Electrochemical oxidation of (A).0.1 M ethanol (B) 0.02 M glycerol and (C) 0.5 M of formic acid using $Au_{77}Pt_{23}$/C material coated on GC electrode. CVs were recorded in 1.0 N H_2SO_4 solution as the background electrolyte with a Pt foil counter electrode and MMS as the reference electrode.