**Supplementary Materials**



**Figure S1.** Schematic diagram showing fabrication of GCE by drop cast method



**Figure S2.** Experimental setup for electrochemical investigations.



**Figure S3.** EDS spectrum of the commercial Pt/C (ETEK) catalyst



**Figure S4** Cyclic voltammogram of platinum-based electrode showing different regions



**Figure S5.** CV scan considered for the ECSA determination of Pt nano particles. Inset shows integrated area for hydrogen adsorption charge.



**Figure S6.** Comparison of cyclic voltammograms of Pt-Cu catalyst VS Pt/C (E-TEK) catalyst. CV scans taken in 0.5 M H2SO4 at 50 mV.s-1



**Figure S7.** Forward scans of cyclic voltammograms showing onset potentials of Pt-Cu and Pt/C catalysts