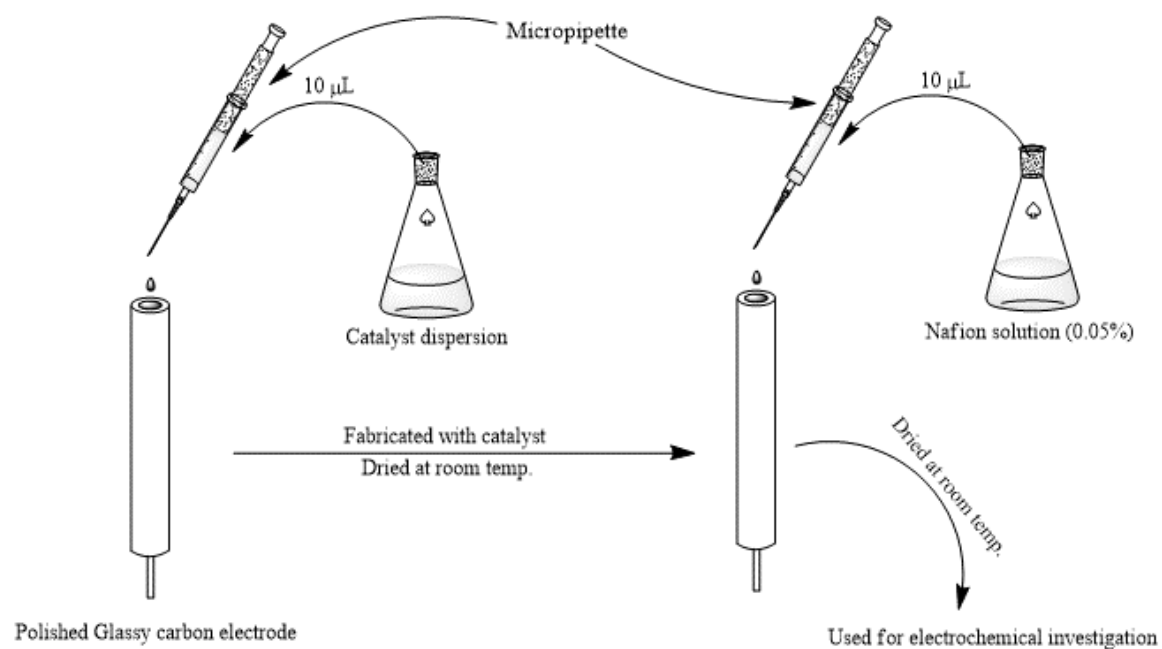
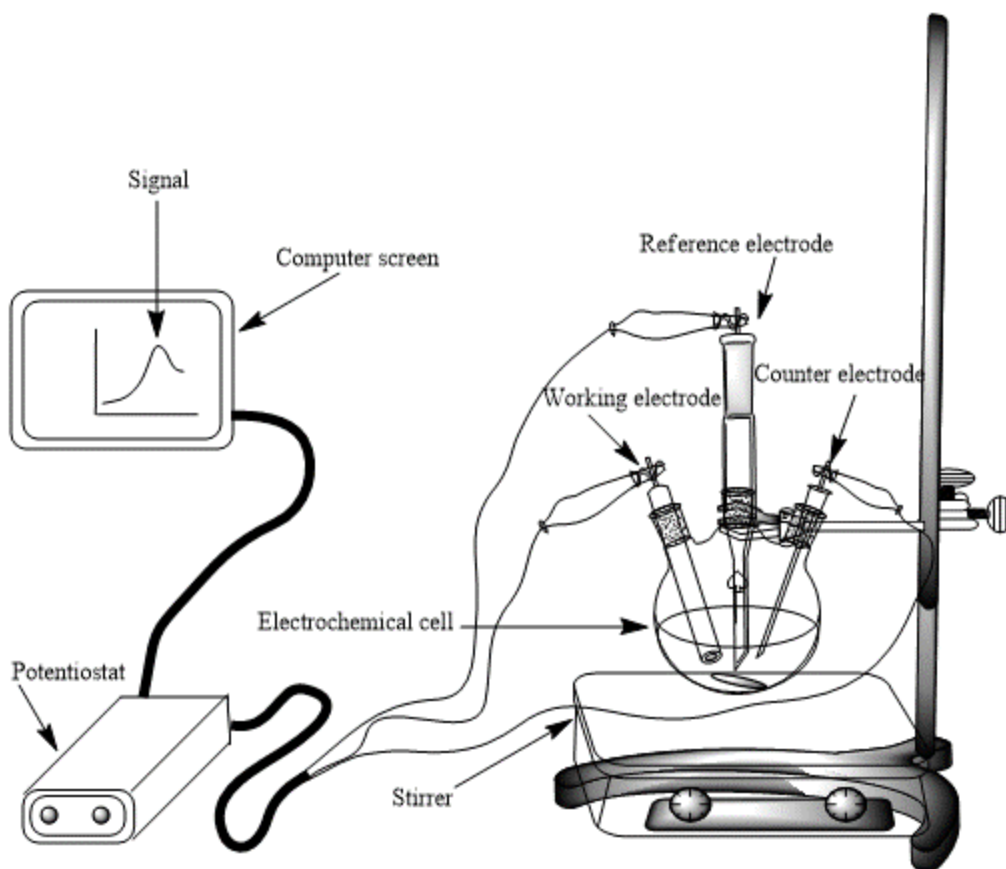


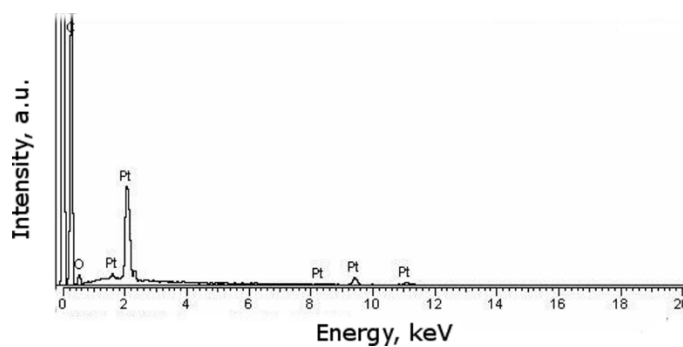
## Supplementary Materials



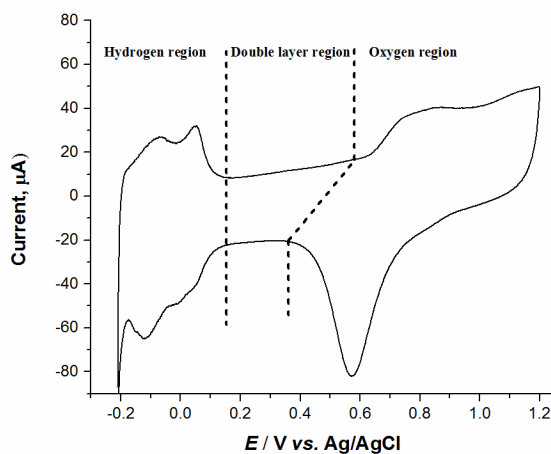
**Figure S1.** Schematic diagram showing fabrication of GCE by drop cast method



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

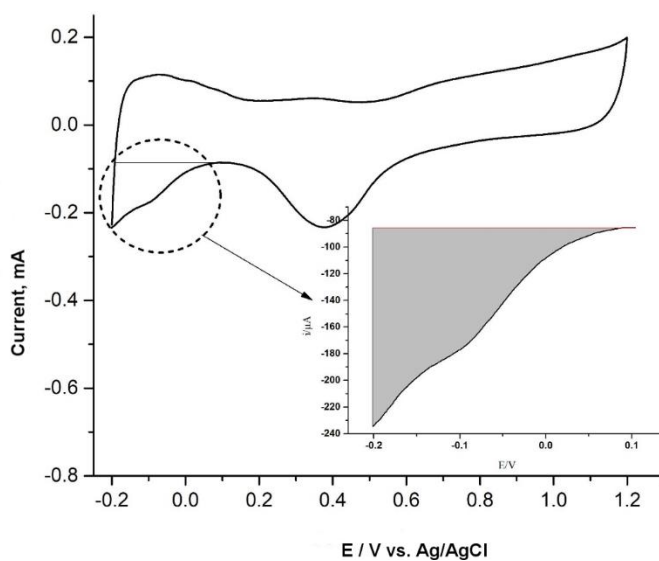


**Figure S3.** EDS spectrum of the commercial Pt/C (ETEK) catalyst



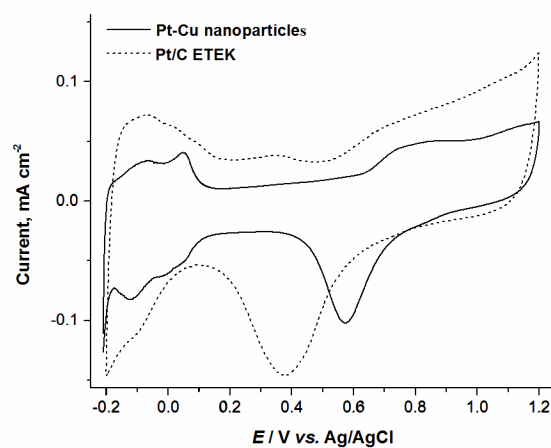
17

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

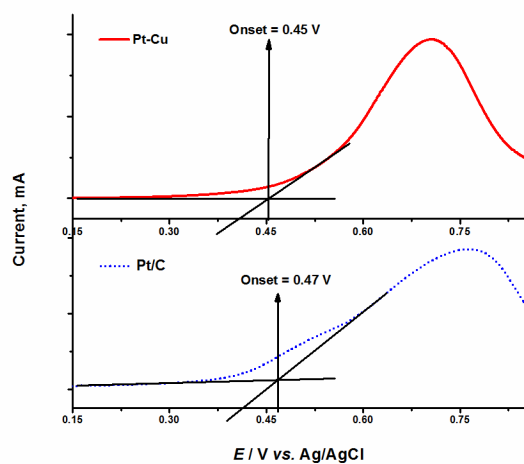


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20 **Figure S5.** CV scan considered for the ECSA determination of Pt nano particles. Inset shows  
 21 integrated area for hydrogen adsorption charge.



**Figure S6.** Comparison of cyclic voltammograms of Pt-Cu catalyst VS Pt/C (E-TEK) catalyst. CV scans taken in 0.5 M H<sub>2</sub>SO<sub>4</sub> at 50 mV.s<sup>-1</sup>



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