Electronic Supplementary Information (ESI)

Development of a novel and efficient H_2O_2 sensor by simple modification of screen printed Au electrode with Ru nanoparticle loaded functionalized mesoporous SBA15

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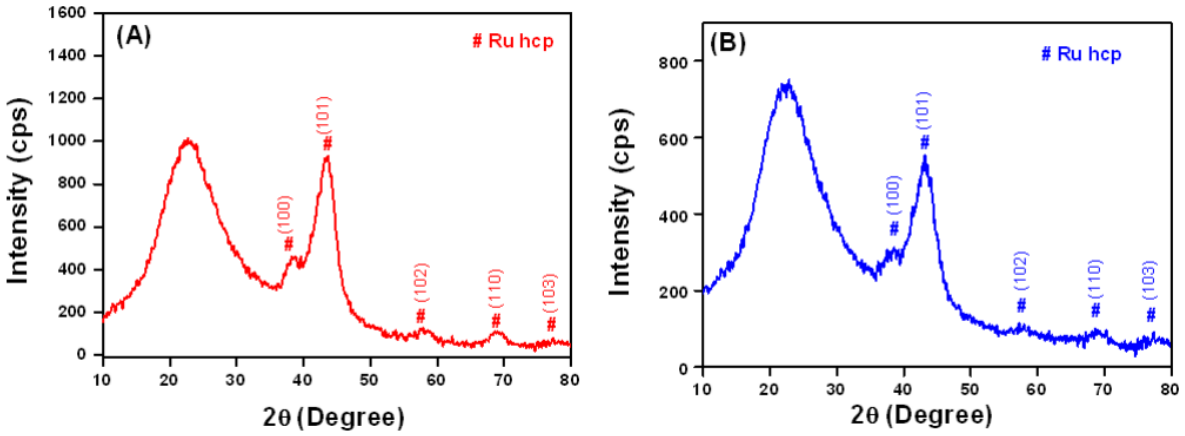

Fig S1: Wide angle XRD spectrum of (A) Ru@SBA15 and (B) Ru@SBA15-SH.

In XRD spectra for Ru@SBA15 and Ru@SBA15-SH samples, diffraction peaks at2θ=38.38°, 43.42° 58.3°, 69.44°, 78.38° corresponding to (100),(101), (102), (110), and (103) diffraction planes of hcp Ru[JCPDS card no. 65-1863] were observed along with the broadpeak of SBA15. In case of Ru@SBA15 we observed all the peaks (Fig.S1) but when we merged all three graphs (SBA15, Ru@SBA15 and Ru@SBA15-SH) except the peak corresponding to (101) all are not visible.

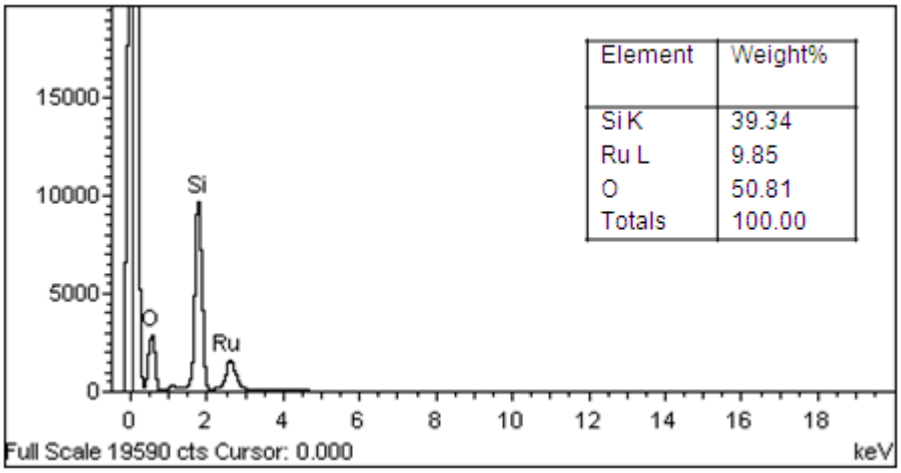

Fig S2: EDS spectra of Ru@SBA15.

The EDS spectra of Ru@SBA15 is shown in Fig S2. From EDS it was found that all the elements were present (i.e. Si, O and Ru) in Ru@SBA15 which proves the incorporation of Ru in SBA15 matrix.

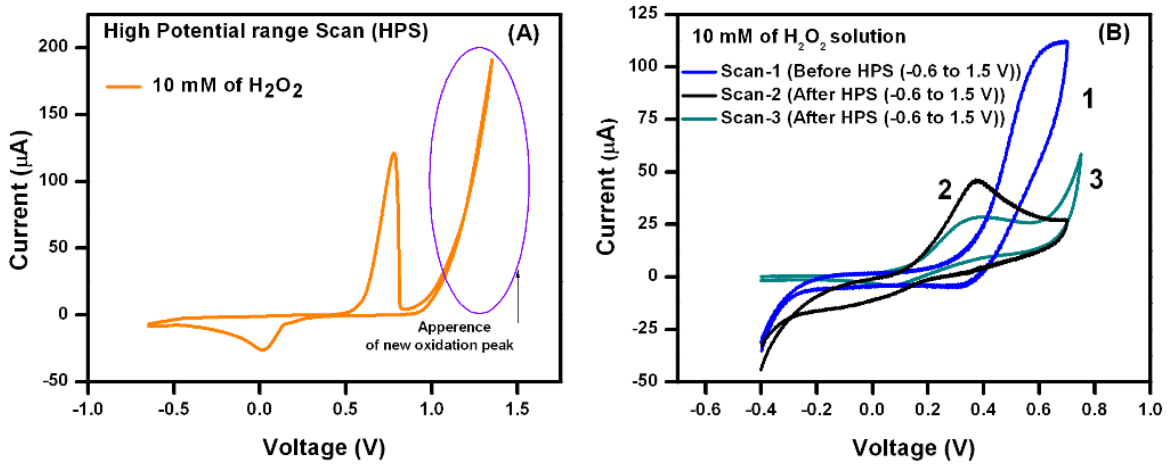

Fig. S3: Cyclic Voltammogram of sensor in presence of 10 mM H_2O_2, (A) High potential range Scan (-0.6 V to 1.5V), (B) Cyclic voltammogram before HPS (scan 1) and After HPS (Scan 2 and 3) with a potential range from -0.4 V to 0.75 V.

When a potential scan from –0.6 V to 1.5 V was carried out additional peaks for oxidation appeared after 1 V in the CV voltammogram which are shown in Fig S3 (A). Moreover, some bubbles were also formed during this scan (–0.6 V to 1.5 V) near the electrode surface which might be due to the oxidation of the electrode surface resulting in deformation of the electrode. The reproducibility of the sensor also reduced when scans with high potential range (-0.6 V to 1.5 V) were conducted (Fig. S3(B)). It was observed that the nature of the voltamogram was altered after the high potential scan and successive measurement lead to non-reproducible voltammograms. Hence in the negative scan of CV the cutoff potential was set at –0.4 V. Therefore we chose the potential range from -0.4 V to 0.75 V and high reproducibility of the sensor was observed (Fig 9 (A), (B) and Fig. 11(A), (B)). Due to this cutoff value (-0.4 V) the negative scan shows smaller response in compared to the oxidation response.