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Supporting Information

A proof of concept for the cooperation from the adjacent quinone groups to N sites during the metal free oxidation of glycerol by nitrogen rich graphene oxide

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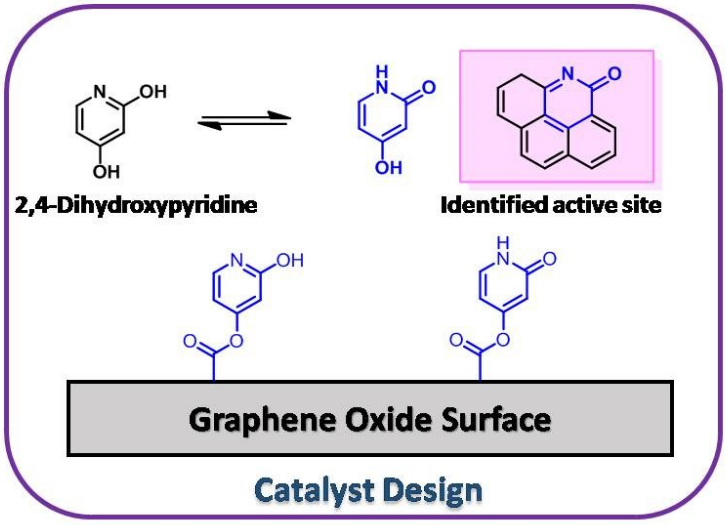

Figure S1: 2,4-dihydroxypyridine (DHP) functionalized graphene oxide catalyst

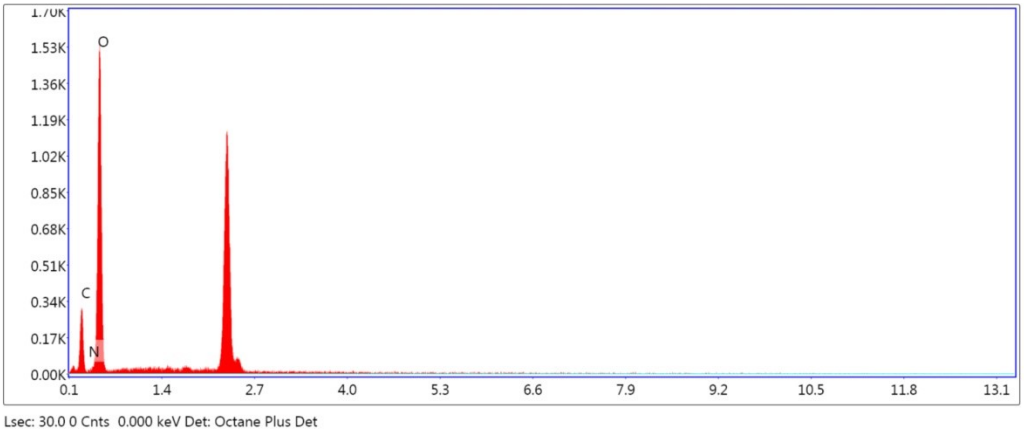

Figure S2: The EDX spectrum showing the elements on the surface of DHP@GO catalyst

Experimental Section

Chemicals: Glycerol and tert-butyl hydroperoxide (TBHP) were purchased from Sigma-Aidrich. 2,4-dihydroxy pyridine (99.4%) was purchased from Alfa Aesar and graphene oxide (99%) was purchased from Platonic Nanotech Pvt. Ltd. Ammonia (99.5%) and sulphuric acid (H_2SO_4) were purchased from Loba Chemie Pvt. Ltd.

Characterization: The surface morphology of the material was studied by transmission electron microscopy (TEM) by using Technai G2s-Twinhigh resolution transmission electron microscope (FEI). The EDX spectrum was obtained along with TEM by using model FP 5022/22-Tecnai G2 20 S-TWIN instrument. The crystalline nature of the materials was studied by powder X-Ray diffraction (XRD) technique using the SmartLab model diffractometer. The Fourier transform infrared spectroscopy **(**FTIR) spectra were recorded using L1600312 spectrum TWOLITA/ZnSe (Agilent Technologies) for confirming the functionality. X-Ray photoelectron microscopy (XPS) data was obtained by PHI 5000 Versa ProbII, FEI Inc. and Prevac.

Catalyst preparation: The nanocomposite material DHP@GO was synthesized by refluxing 2,4-dihydroxy pyridine (40 mg) with GO (200 mg) by adding few drops of H_2SO_4 in H_2O (5ml) at 50º C for 2 hours. After the end of the reaction, the catalyst was filter with whatman filter paper and dries the sample in an oven at 50º C for 24 hours. Moreover, $CONH_2$@GO was synthesized by refluxing ammonia (40mg) with GO (200mg) and acidify with few drops of H_2SO_4 in H_2O (5ml) at 50º C for 2 hours. In the end of the reaction, the material $CONH_2$@GO was filter and dries the sample for 24 hours in an oven at 50º C.

Glycerol oxidation: The catalytic glycerol oxidation reaction, performed in a stainless steel reactor equipped with heater, mechanical stirrer, gas supply system and thermometer. Glycerol (3 mmol), and TBHP 6 mmol (TBHP 70% in water), glycerol/catalyst 5/1 wt/wt, were mixed in distilled water under 1250 rpm at 60°C. After the end of the reaction, the reactor was cooled down at room temperature. Samples were removed periodically (0.2 mL) and HP 7820A gas chromatograph equipped with a capillary column HP-5 30m x 0.32mm, 0.25 µm Film, by Agilent Technologies. Identification of the products was completed by using a Thermo Scientific Trace ISQ QD Single Quadrupole GC-MS equipped with a capillary column HP-5 30 m x 0.32 mm, 0.25 x m Film, by Agilent Technologies.