Electronic Supplementary Material (ESI) for Green Chemistry

Supplementary Information

For

Co-immobilization of Multi-enzyme on Control-Reduced Graphene Oxide by Non-covalent Bond: an Artifical Biocatalytic System for One-pot Production of Gluconic Acid from Starch

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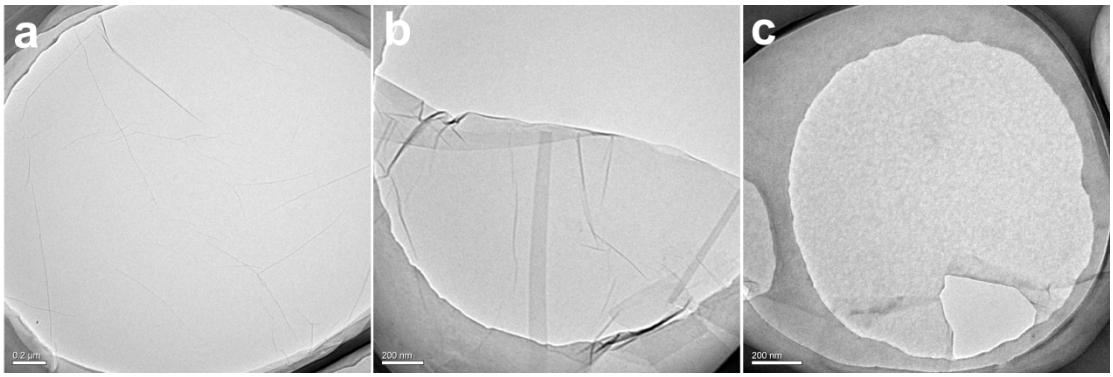

Fig. S1 TEM images of (a) GO, (b) CRGO-2 and (c) double enzymes (GA and GOD) bonded CRGO-2.

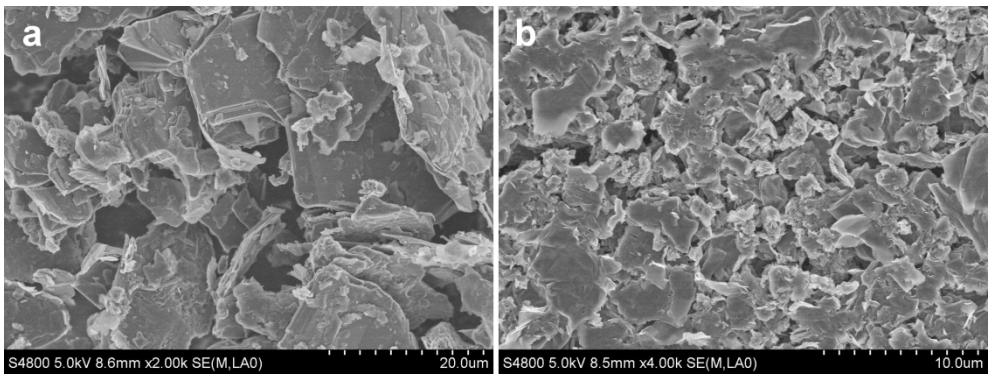

Fig. S2 SEM images of (a) graphite and (b) GO.

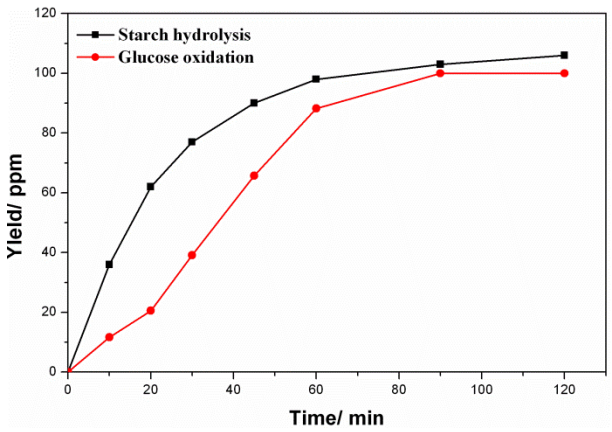

Fig. S3 The process of starch hydrolysis catalyzed by CRGO-2 immobilized GA and glucose oxidation catalyzed by CRGO-2 immobilized GOD with the same enzyme concentration.

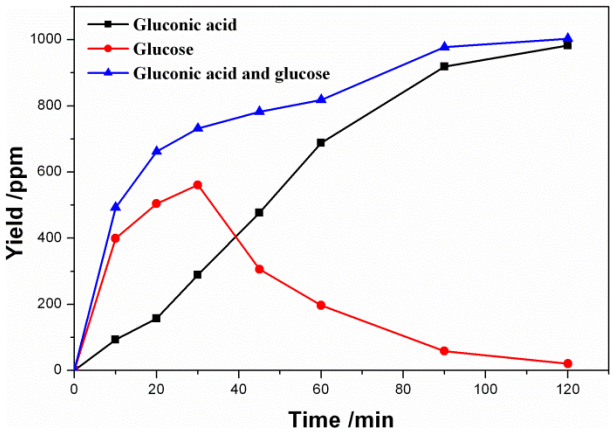

Fig. S4 The enzymatic process of the microsystem for starch hydrolysis coupled with glucose oxidation in one pot at 50 °C and pH 5. Concentration of the multi-enzyme biocatalyst is 0.2 mg/mL and of initial soluble starch is 1 mg/mL. The mass ratio of GA: GOD loaded on the CRGO-2 carrier is 1:1.3.

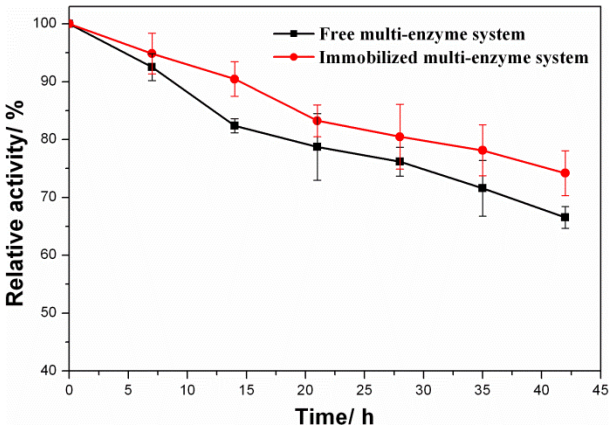

Fig. S5 Thermal stability of free and immobilized multi-enzyme system at 50 °C. Free or immobilized multi-enzyme was incubated in pH 5 buffer at 50 °C for different time. The activities of them were determined by measuring the amounts of released gluconic acid.

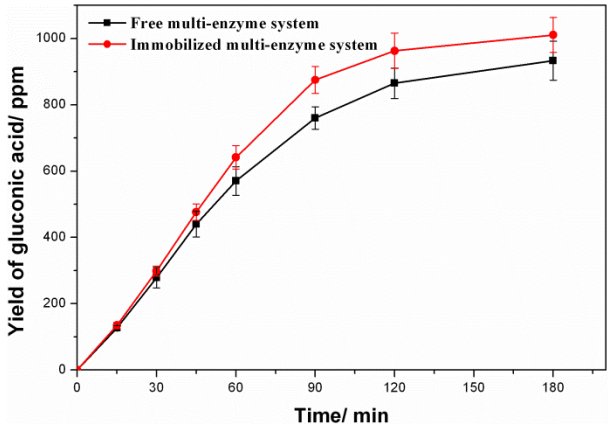

Fig. S6 Catalytic efficiency of free and immobilized multi-enzyme system at the optimized condition (pH 5 and 50 °C). The same amounts of enzymes in immobilized two-enzyme system

and free two-enzyme system were used to convert equal starch into gluconic acid at 50 °C and pH 5. The yield of gluconic acid was monitored to compare the catalytic efficiency.