Electronic Supplementary Information

CRGO/alginate microbeads: an excellent enzyme immobilization system and its potential application for continuous enzymatic reaction †

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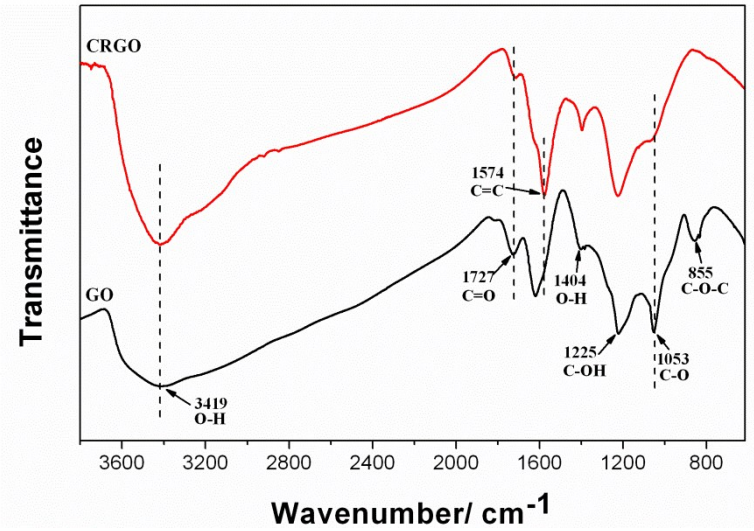

Fig. S1. FTIR spectra of GO and CRGO.

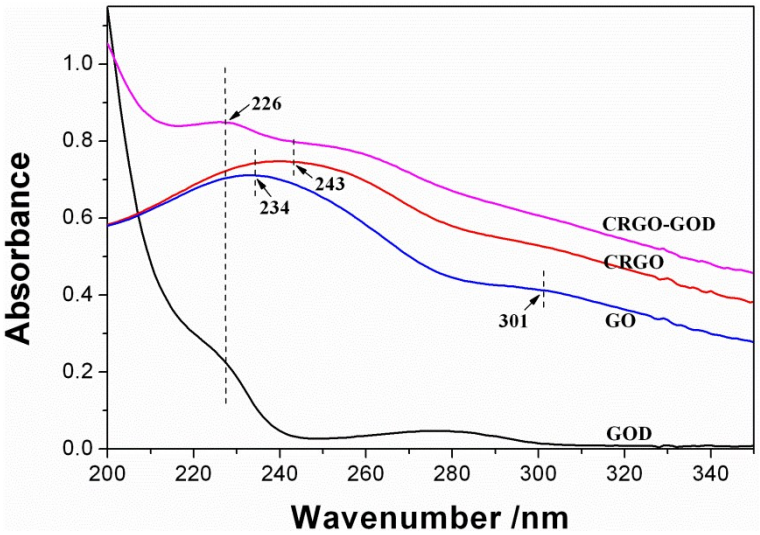

Fig. S2. UV/Vis spectra of GOD, GO, CRGO and CRGO-GOD.

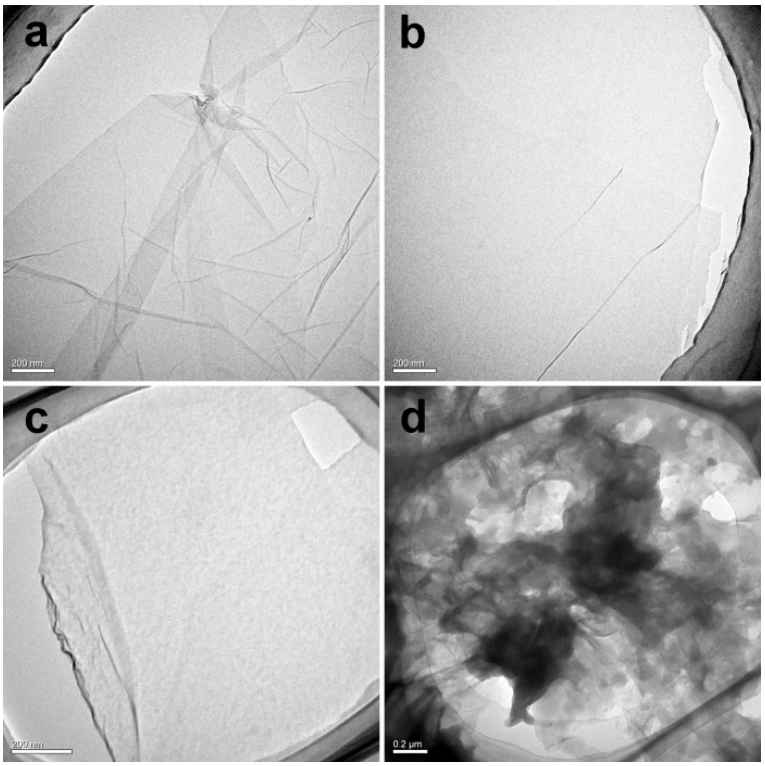

Fig. S3. TEM images of GO (a), CRGO (b), GOD-CRGO (c) and GOD-CRGO@Alg (d).

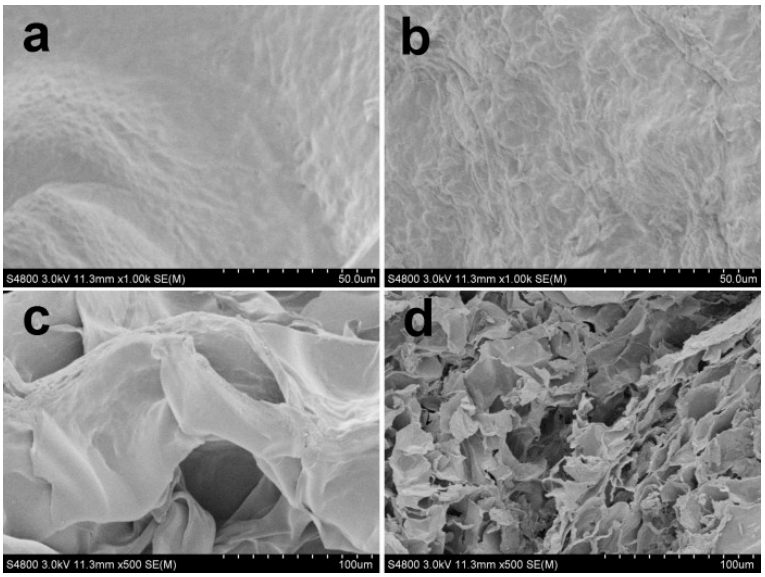

Fig. S4. SEM images of the surface of (a) GOD@Alg and (b) CRGO-GOD@Alg beads, and the cross section of (c) GOD@Alg and (d) CRGO-GOD@Alg beads. GOD@Alg shows a relatively smooth coating whereas CRGO-GOD@Alg leads to a more crumpled surface.

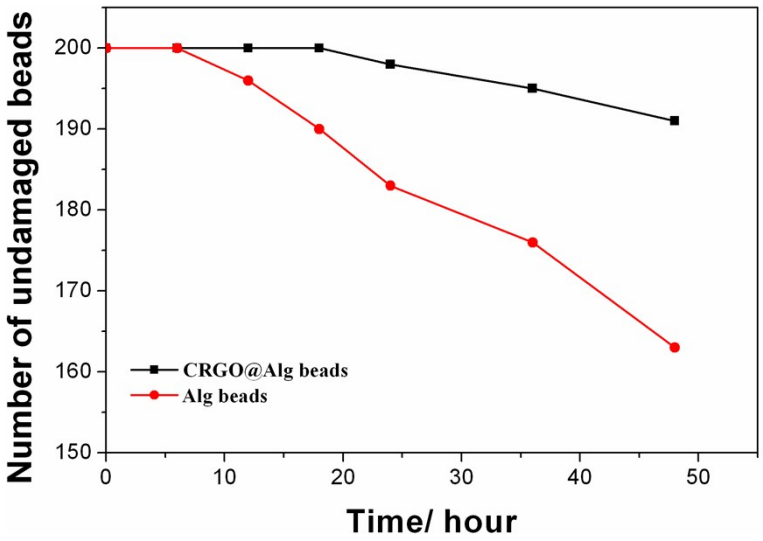

Fig. S5. Mechanical strength of alginate beads and CRGO-alginate hybrid beads. The number of undamaged CRGO-alginate hybrid beads was much more than that of alginate beads under the same conditions, which indicated that the mechanical strength was enhanced when CRGO was added.

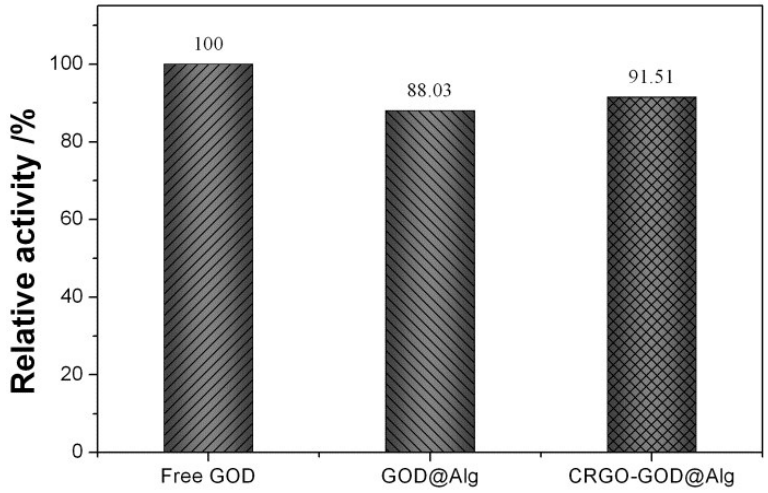

Fig. S6. Relative specific activity of the native GOD, GOD@Alg and CRGO-GOD@Alg. The specific activity of the free enzyme was set to 100%.

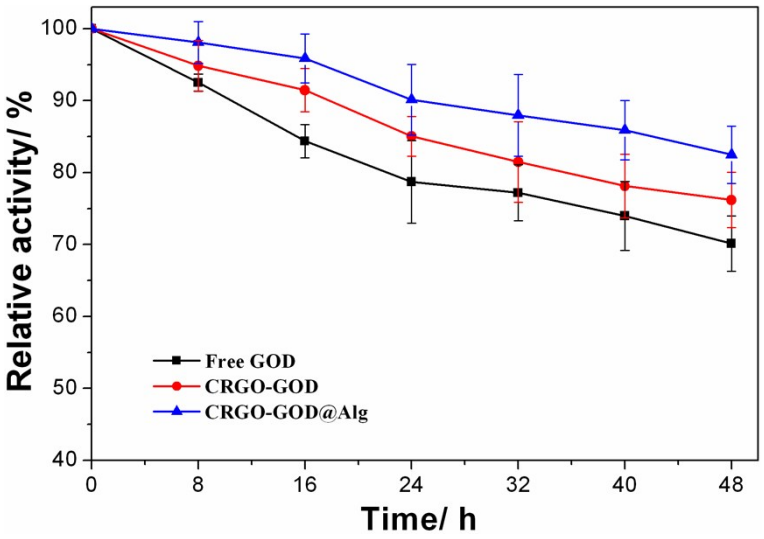

Fig. S7. Thermal stability of CRGO-GOD@Alg, CRGO-GOD and free GOD at 50°C (The initial enzymatic activity of each enzyme was set to 100%). Free and immobilized GOD was incubated in pH 5 buffer solution at 50°C for equal time. The activity of CRGO-GOD@Alg retained above 82% 48 hours later, which is obviously higher than the other two forms.

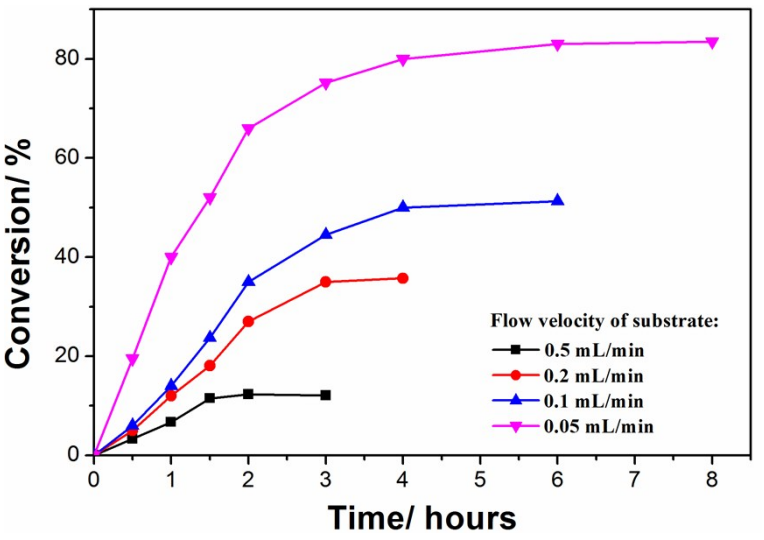

Fig. S8. Effect of the flow velocity of substrate on conversion (concentration of substrate: 0.5 mg/mL, temperature: 50°C).

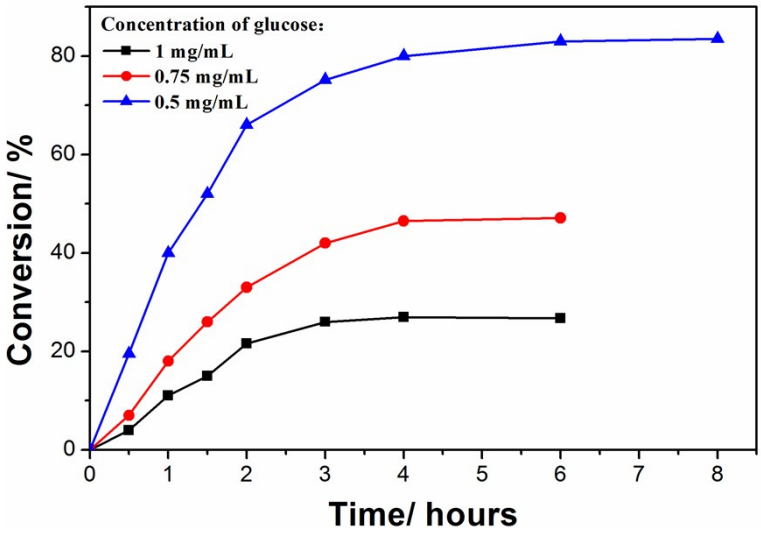

Fig. S9. Effect of the concentration of substrate on conversion (flow velocity of substrate: 0.05 mL/min, temperature: 50°C).