Supporting Information

Fast immobilization of human carbonic anhydrase II on Ni-based metal-organic framework nanorods with high catalytic performance

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Table S1 The amount of immobilized His-hCA II.

| Free Enzyme | Immobilized Enzyme |
|-------------|---------------------|
|             | Protein | Specific Activity | Protein in washing | Bound Protein | Total Activity(U) | Specific Activity | Protein Yield (%)|
|             | Protein  | (mg/ml) | (U/mg) | (U/mg) | Activity(U) | (U/mg) | (%)|
|             | 0.4 | 1.96  | 0.273 | 0.127 | 1054.1 | 8296.3  | 31.76|

Table S2 Michaelis–Menten kinetics parameters of immobilized and free enzymes

|                     | K_m (mmol/L) | V_max (mmol/min) |
|---------------------|--------------|------------------|
| Free enzyme         | 1.82         | 0.037            |
| Immobilized enzyme  | 1.96         | 0.035            |

Figure S1 XPS spectra of Ni-BTC nanorods: (a) full scan, (b) Ni 2p, (c) N 1s.
Fig. S2. TG curves of Ni-BTC.

Fig. S3. The plasmid map of pETDuet-l-His-hCA II.
Fig. S4. SDS-PAGE of purified the recombinant hCA II from the culture supernatant. (Lane 1: His6-tagged hCA II purified using Ni-NTA column, Lane 2: supernatant of hCA II cell lysate, Lane 3: molecular weight marker)

Fig. S5. (A) The protein shedding rate of immobilized enzyme at different pH and (B) the protein shedding rate of immobilized enzyme at different temperatures.
Fig. S6. The catalytic activity of His-hCA II@Ni-BTC and free enzyme at the same protein concentration was studied at 40 °C and 50 °C.

Fig. S7. The protein shedding rate of cycle process.
