Graphene/ZIF-8 composites with tunable hierarchical porosity and electrical conductivity

Daeok Kim,[a] Dae Woo Kim,[b] Won G. Hong[c] and Ali Coskun*[ad]

[a] Graduate School of Energy, Environment, Water and Sustainability (EEWS), Korea Advanced Institute of Science and Technology (KAIST), Daejeon 305-701, Republic of Korea.

[b] Department of Chemical & Biomolecular Engineering, KAIST, Daejeon 305-701, Republic of Korea.

[c] Nano-Bio Electron Microscopy Research Group, Korea Basic Science Institute, Daejeon, 305-338, Republic of Korea

[d] Department of Chemistry, KAIST, Daejeon 305-701, Republic of Korea.

Electronic Supplementary Information (ESI)

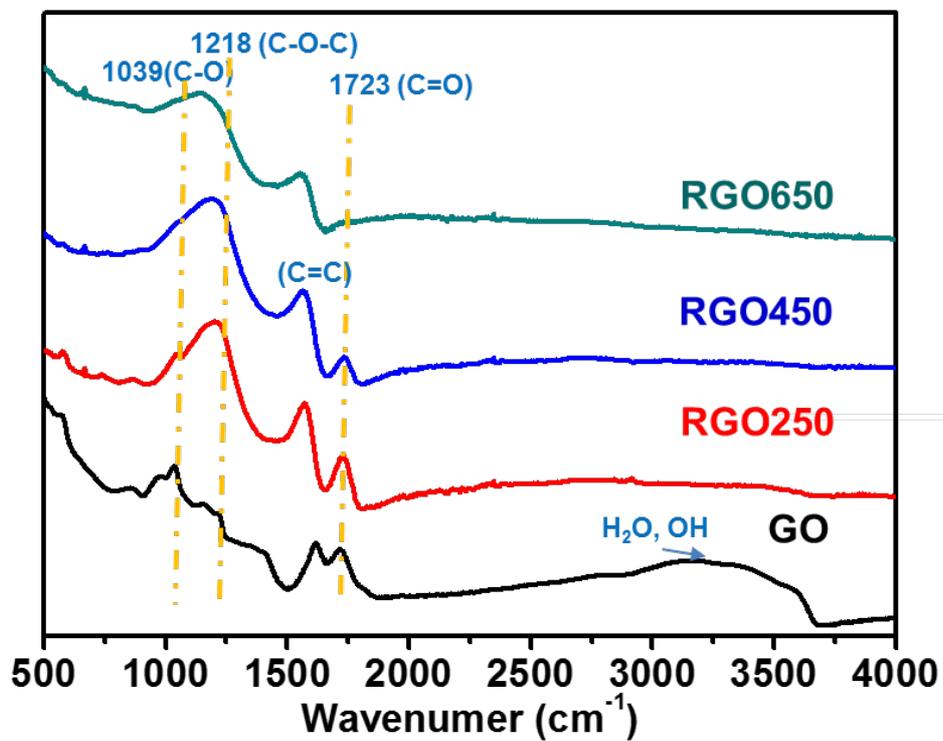| * Correspondence Address |
| --- |
| Professor Ali Coskun
Graduate School of EEWS and
Department of Chemistry
Korea Advanced Institute of Science and
Technology (KAIST)
373-1 Guseong Dong, Yuseong Gu, Daejeon
305-701 (Republic of Korea).
Tel: (+82)-42-350-1724
Fax: (+82)-42-350-1710
E-Mail: coskun@kaist.ac.kr |

Fig. S1 FT-IR spectra of graphene oxide (GO) and reduced graphene oxides (RGOs) obtained after thermal annealing of GO at 250, 450 and 650°C.
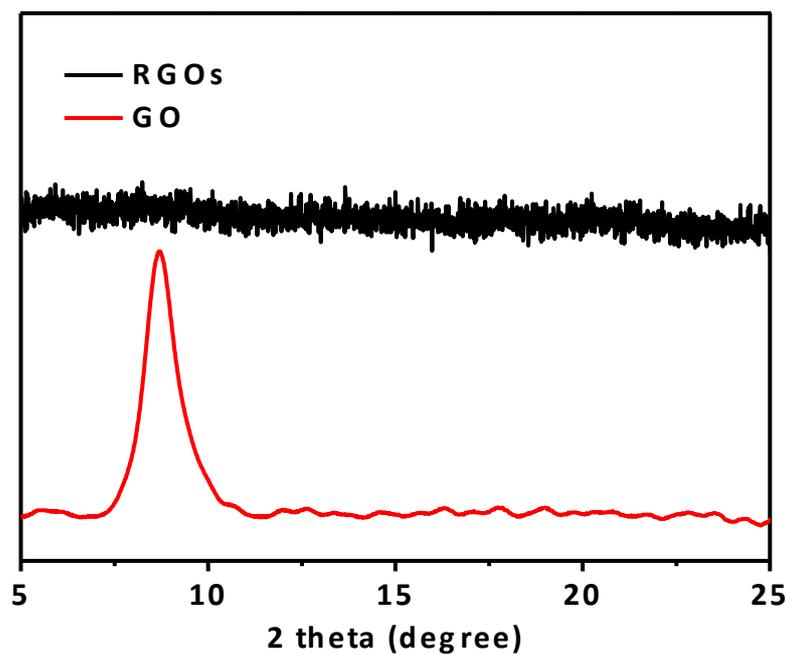
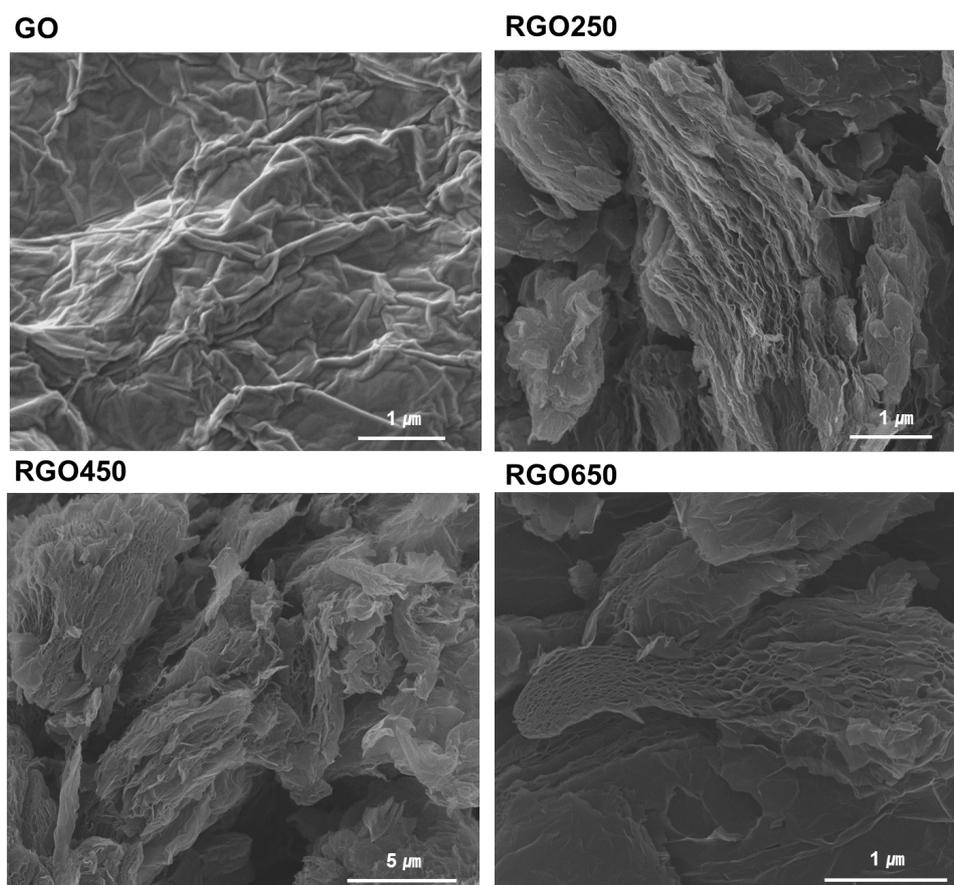**Fig. S2** PXRD spectra of GO (red) and RGOs (black).

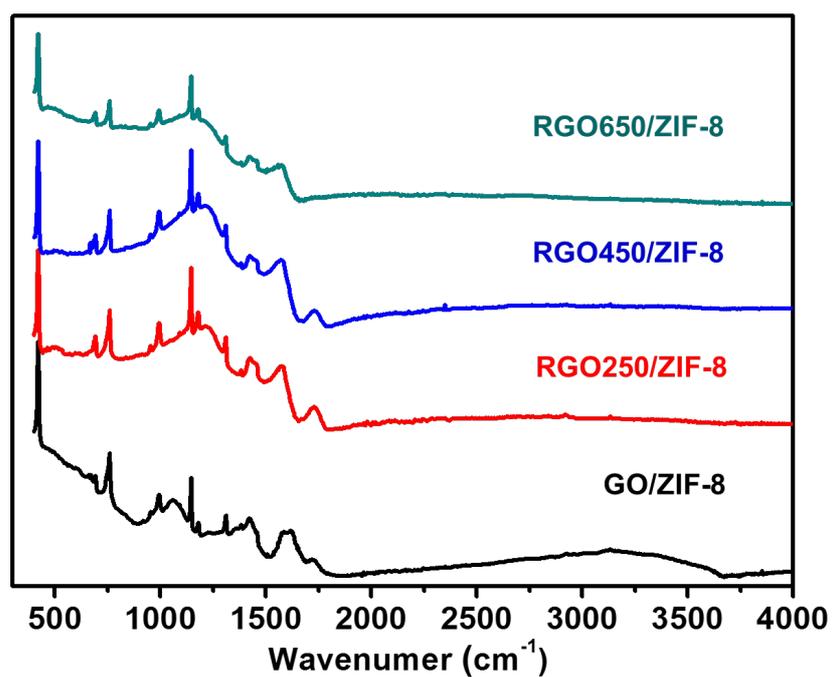**Fig. S3** SEM images of GO and RGOs obtained after thermal annealing of GO at 250, 450 and 650°C.

Fig. S4 FT-IR spectra of GO and RGO/ZIF-8 nanocomposites.
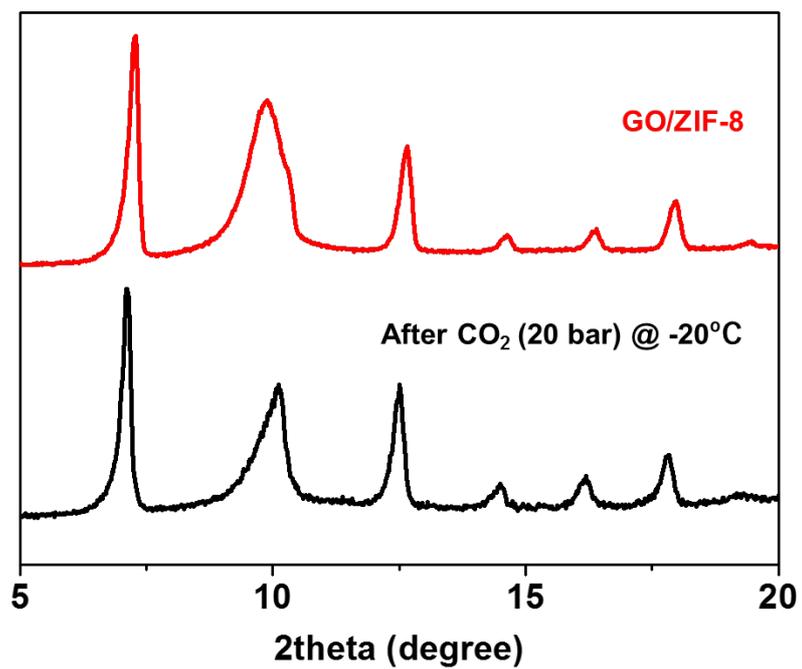

Fig. S5 PXRD spectra of GO/ZIF-8 before (red) and after CO_2 pressurization at 20 bar, 253 K (black).
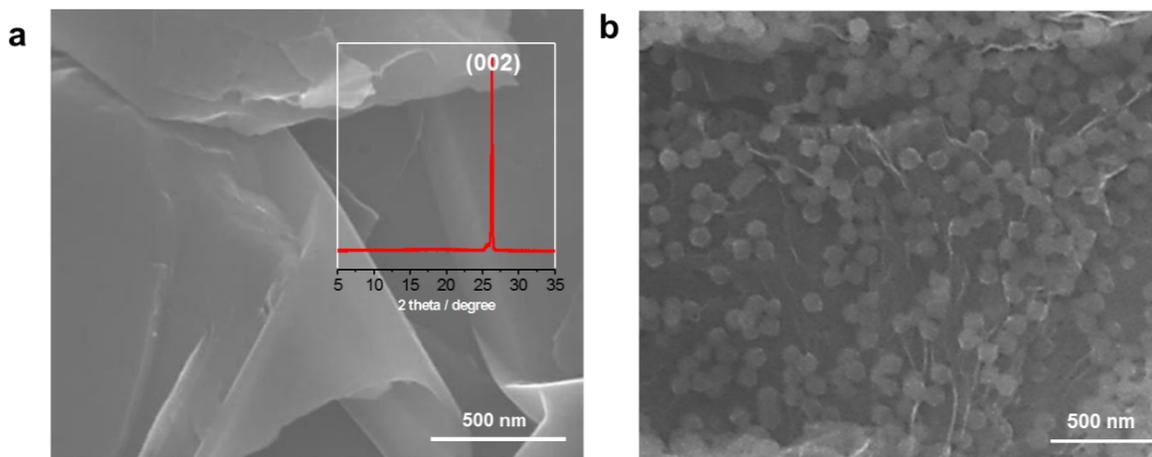
Fig. S6 SEM images of (a) graphite and (b) RGO650 after their immersion into the suspension of ZIF-8 crystals and subsequent washing with MeOH to remove any physisorbed crystals. Subset of (a) is the corresponding XRD pattern after washing.
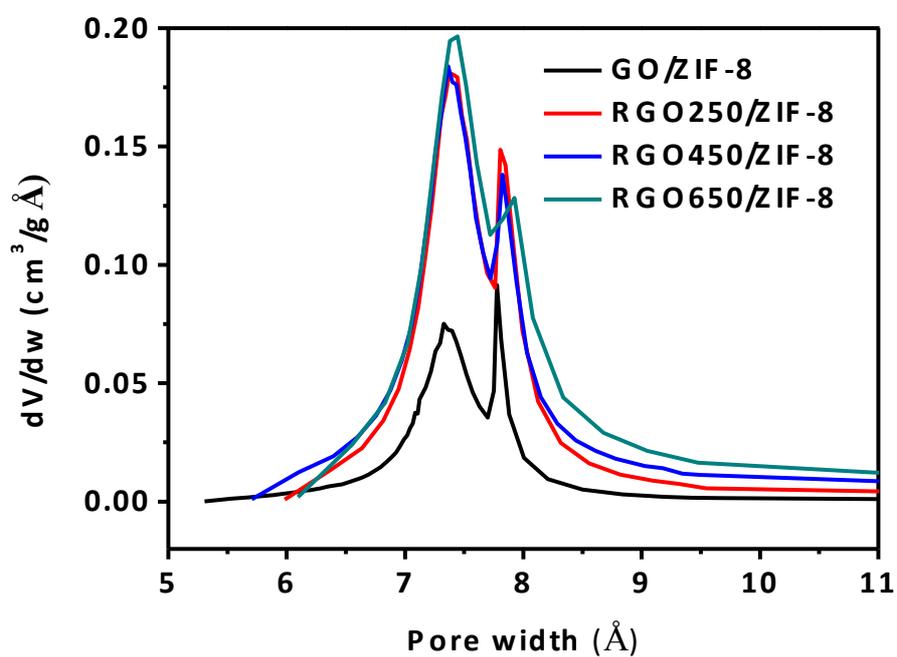

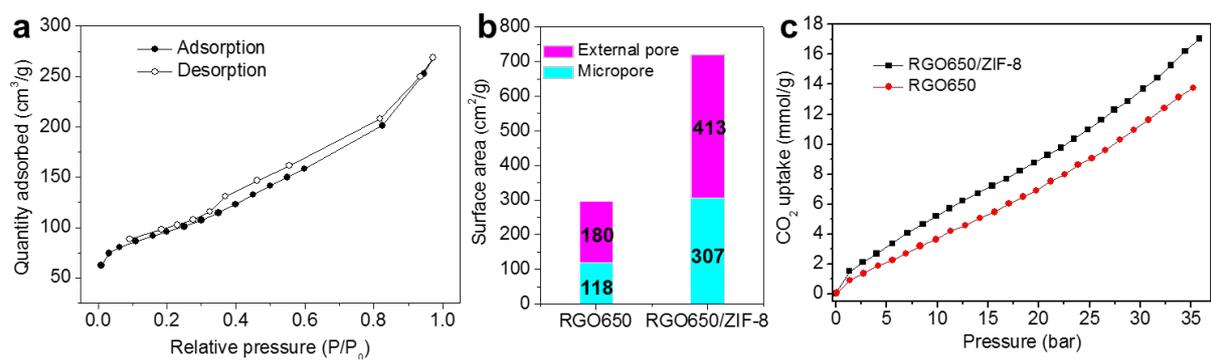**Fig. S7** Pore size distributions of GO- and RGO/ZIF-8 nanocomposites.

Fig. S8 (a) Ar isotherm of RGO650. BET surface area analyses (b) and the comparison of CO_2 uptake capacities (c) of RGO650 and RGO650/ZIF-8 at 303 K, up to 35 bar.