

## Electronic Supplementary Information

### Flattening sol-gel nanospheres into carbon sheets-intercalated sandwich-nanostructures: cobalt/carbon/cobalt

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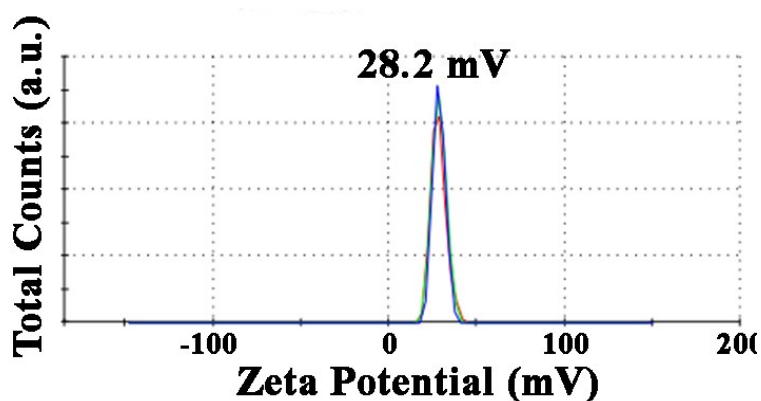


Fig. S1 The zeta potential of the sample after adding cobalt ions.

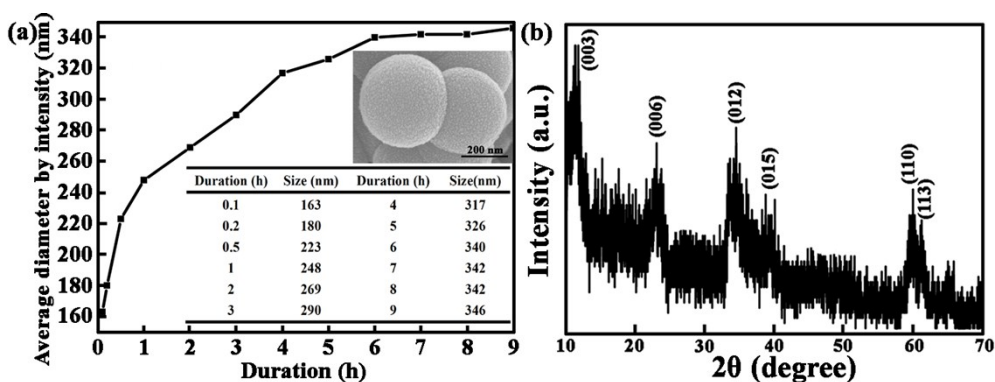


Fig. S2 The average diameter of the precursors with reaction time extension, the inset image is SEM result of the precursors after the reaction duration of 9 h; (b) the XRD spectrum of the precursors.

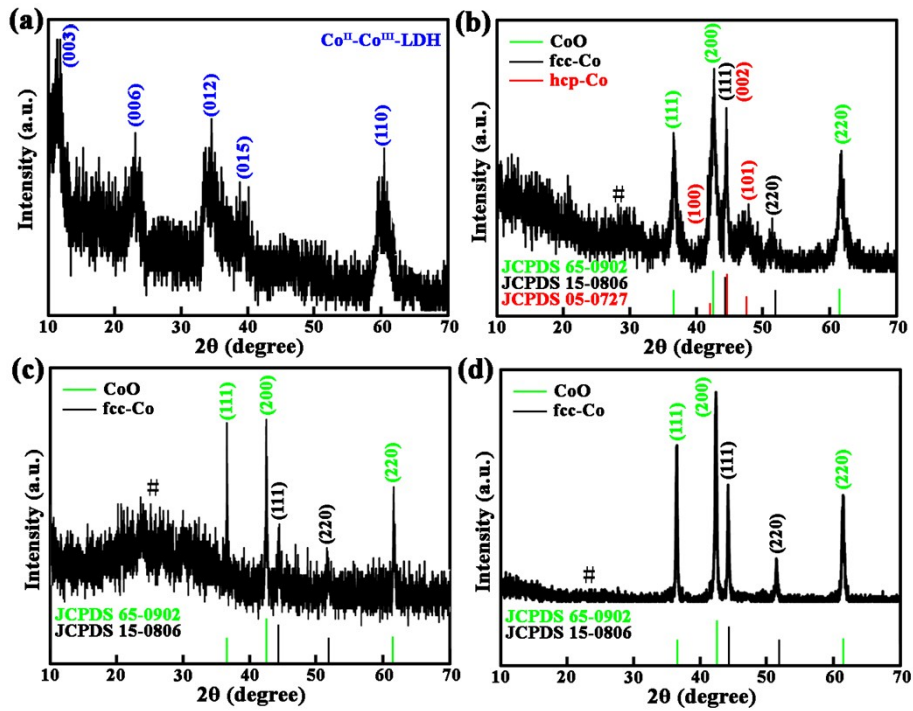


Fig. S3 The XRD spectra of the products under the Ar gas atmosphere sintered for 4 h at different temperatures: (a) 100 °C; (b) 300 °C; (c) 500 °C; (d) 700 °C (# indicates amorphous carbon).

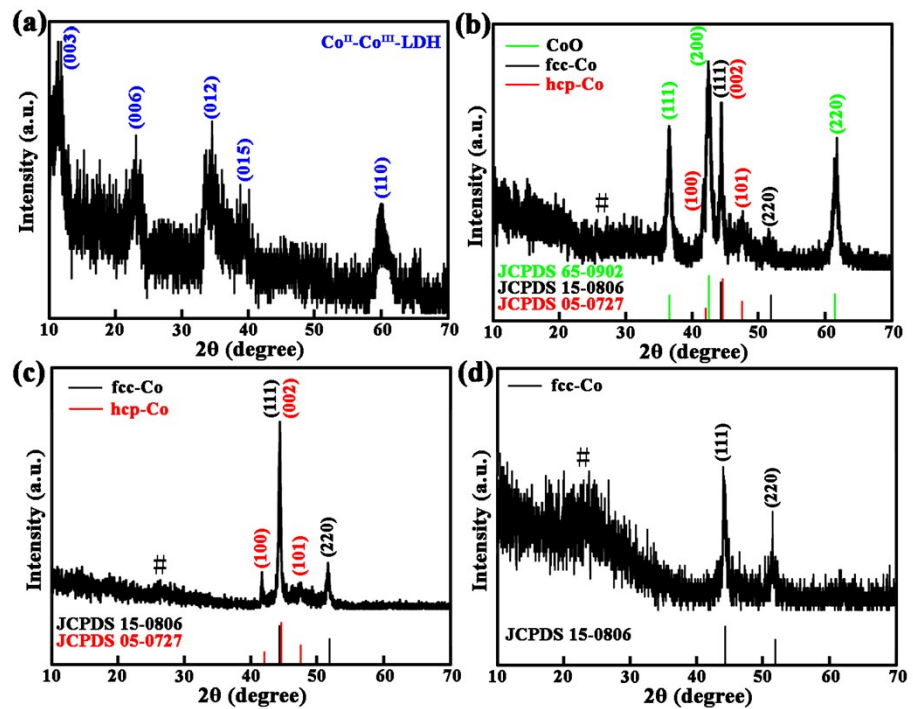
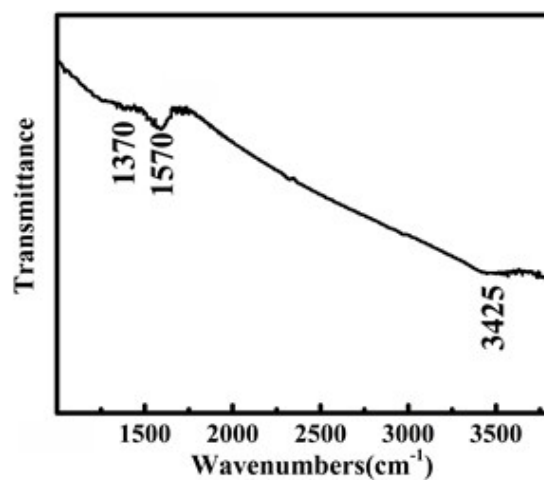


Fig. S4 The XRD spectra of the products under the vacuum atmosphere sintered for 4 h at different temperatures: (a) 100 °C; (b) 300 °C; (c) 500 °C; (d) 700 °C (# indicates amorphous carbon).

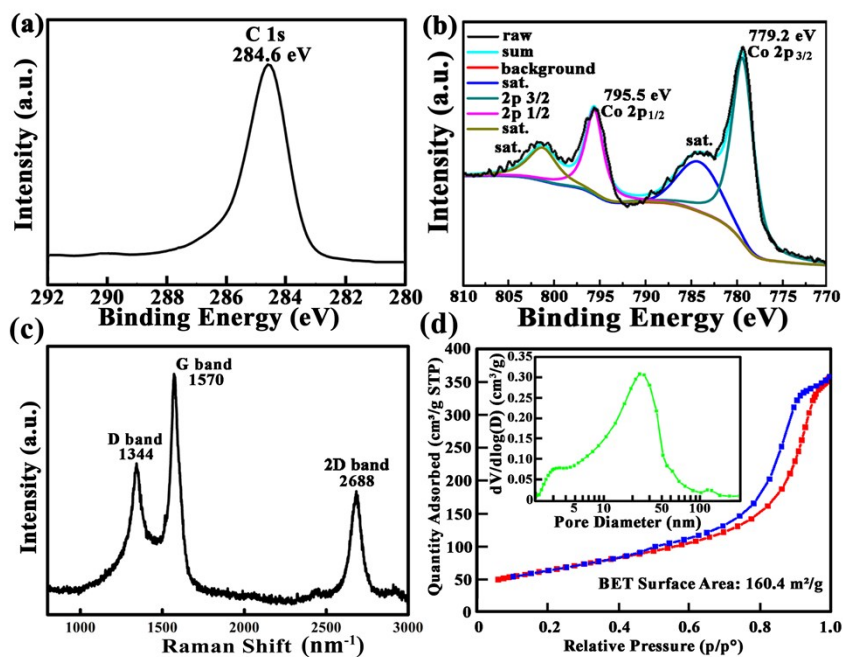
**Table S1** The summarized products obtained in Ar gas and vacuum atmosphere at different sintering temperatures according to their XRD results.

| Sintering Temperature (°C) | Atmosphere                                       |  |
|----------------------------|--|--|
|                            | Ar   | Vacuum   |
| 100                        | Co <sup>II</sup> -Co <sup>III</sup> -LDH         | Co <sup>II</sup> -Co <sup>III</sup> -LDH         |
| 300                        | CoO, <i>fcc</i> -Co, <i>hcp</i> -Co, <i>a</i> -C | CoO, <i>fcc</i> -Co, <i>hcp</i> -Co, <i>a</i> -C |
| 500                        | CoO, <i>fcc</i> -Co, <i>a</i> -C                 | <i>fcc</i> -Co, <i>hcp</i> -Co, <i>a</i> -C      |
| 700                        | CoO, <i>fcc</i> -Co, <i>a</i> -C                 | <i>fcc</i> -Co, <i>a</i> -C                      |

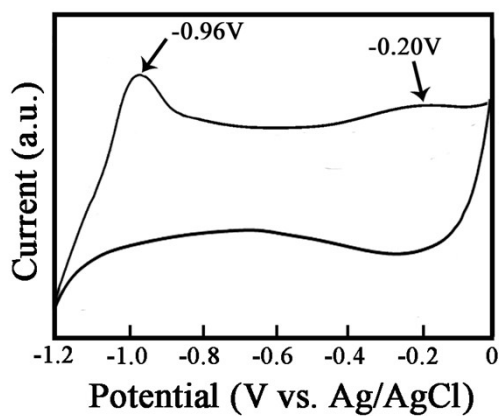
*hcp*-Co: hexagonal close packing Co; *fcc*-Co: face-centered cubic cobalt; *a*-C: amorphous carbon.



**Fig. S5** The FT-IR spectra of the resultant Co/C/Co.



**Fig. S6** (a) and (b) XPS spectra of the as-obtained product: (a) C 1s spectrum and (b) Co 2p spectrum; (c) and (d) Raman spectrum and N<sub>2</sub> adsorption/desorption isotherm of the product.



**Fig. S7** Cyclic voltammogram curve of the product.