Electronic Supplementary Information (ESI) for

Anchoring superparamagnetic core-shells onto reduced graphene oxide: fabrication of Ni-carbon-rGO nanocomposite for effective adsorption and separation

Hang Du,[a] Zhen Wang,[a] Yinghao Chen,[a] Yanyan Liu,[a] Yushan Liu,[a] Baojun Li,*[ab] Xiangyu Wang*[a] and Huaqiang Cao[b]

[a] College of Chemistry and Molecular Engineering, Zhengzhou University, 100 Science Road, Zhengzhou 450001, P R China.

[b] Department of Chemistry, Tsinghua University, 1 Tsinghua Park, Beijing 100084, P R China.

*Corresponding author. E-mail: lbjfcl@zzu.edu.cn (B. J. Li) and xiangyuwang@zzu.edu.cn (X. Y. Wang)

Experimental section

Preparation of carbon-rGO composite (C-rGO). Graphite oxide (200 mg) was dispersed into deionized water (200 mL) to form an aqueous suspension of graphene oxide (GO) under ultrasonic bath with agitating for 2 h. Then glucose (4.504 g) was added, stirred for 30 min. The mixture was then transferred into a Teflon-lined stainless steel autoclave (500 mL), heated to 180 °C, and kept for 24 h. After being cooled to room temperature, the solid was separated by filtration, washed with water and dried under 80 °C for 12 h. The solid was then heated to 550 °C with a rate of 10 °C min^{-1} and kept for 1 h in an N_2 flow. After being cooled naturally to room temperature, the powder was obtained and nominated as C-rGO.

Preparation of 0.7C and 0.2Ni. The 0.7C composite was prepared by the procedure similar to that of NGC with GO (200 mg, 200 mL), $Ni(NO_3)_2$•$6H_2O$ (1.0 g, 10 mL), polyvinyl pyrrolidone (PVP, 0.150 g), NaOH (0.27 g, 10 mL) and glucose (1.75 g). The 0.2Ni composite was prepared by the procedure similar to that of NGC with GO (400 mg, 400 mL), $Ni(NO_3)_2$•$6H_2O$ (0.40 g, 10 mL), polyvinyl pyrrolidone (PVP, 0.150 g), NaOH (0.11 g, 10 mL) and glucose (0.30 g).

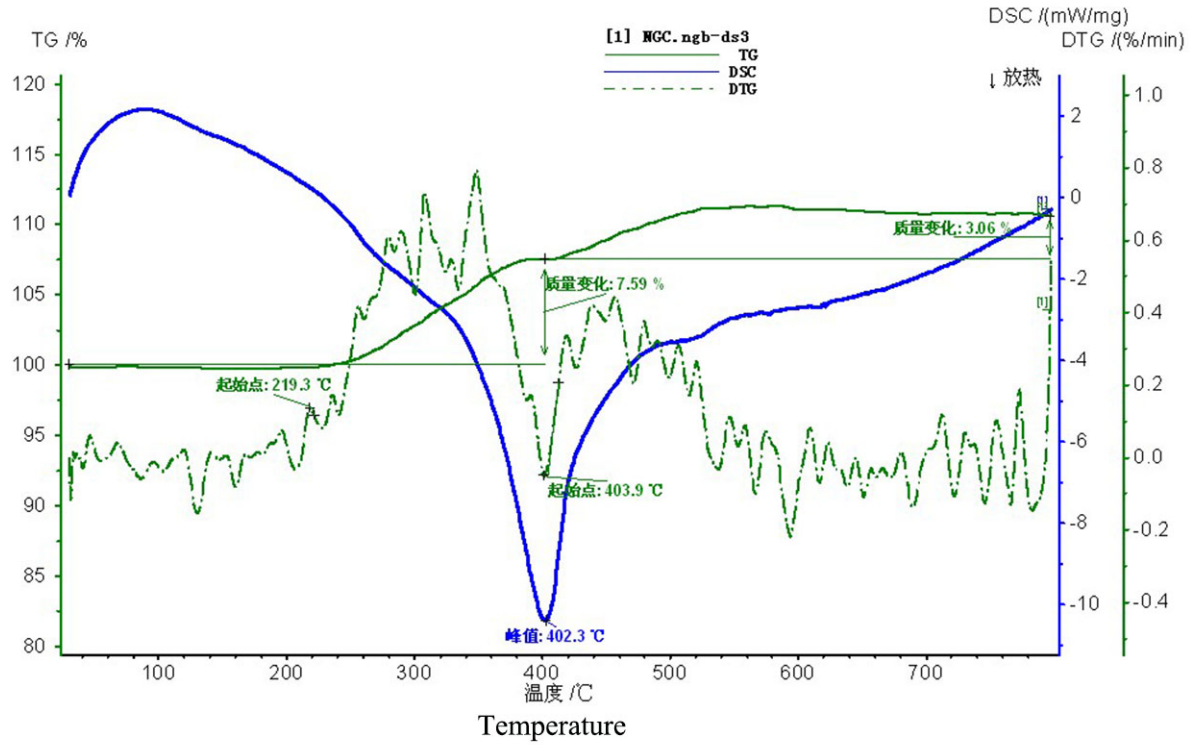

Figure S1. Thermal analysis of NGC in air atmosphere with a heating rate of 10 ℃ min^{-1}.

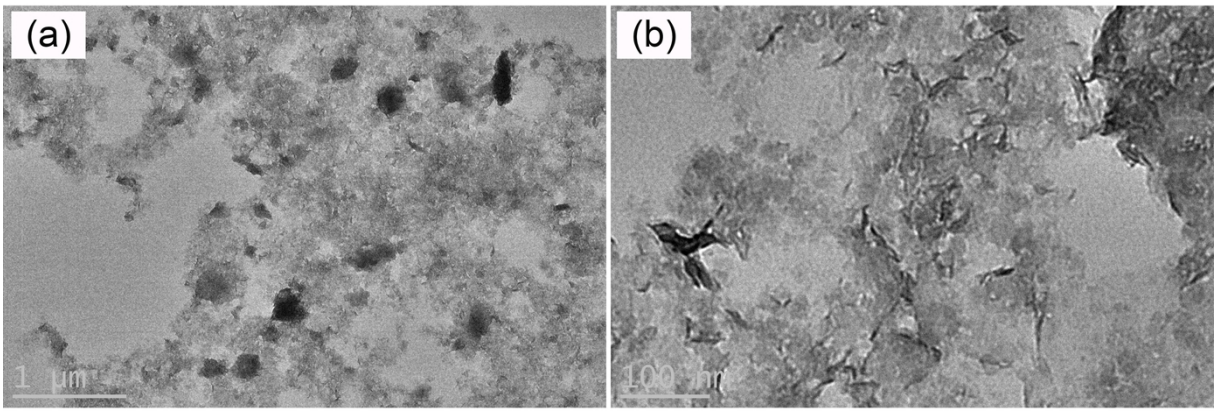

Figure S2. TEM images of $Ni(OH)_2$ NSs-carbon@rGO for synthesis of NGC.

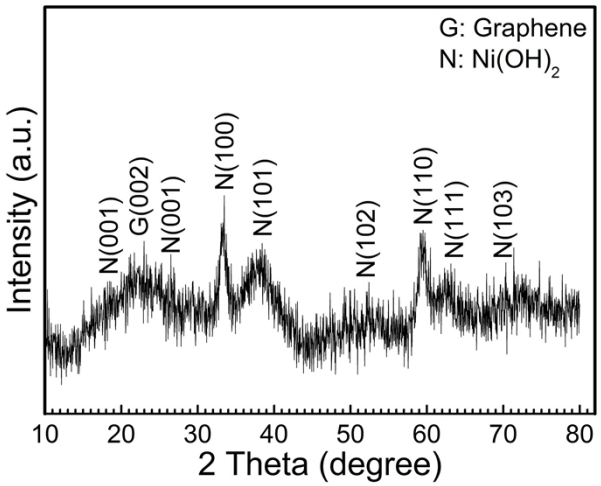

Figure S3. Pattern of $Ni(OH)_2$ NSs-carbon@rGO for synthesis of NGC.

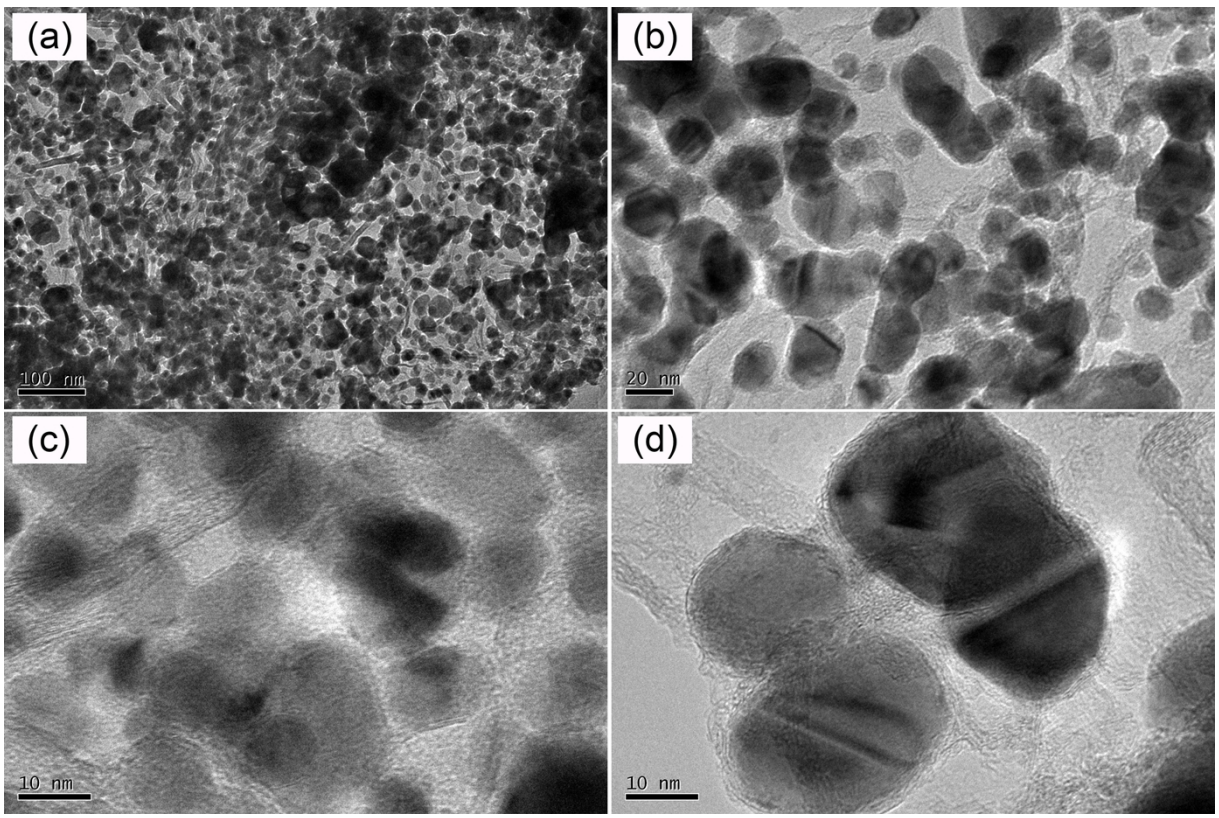

Figure S4. TEM images of NGC.

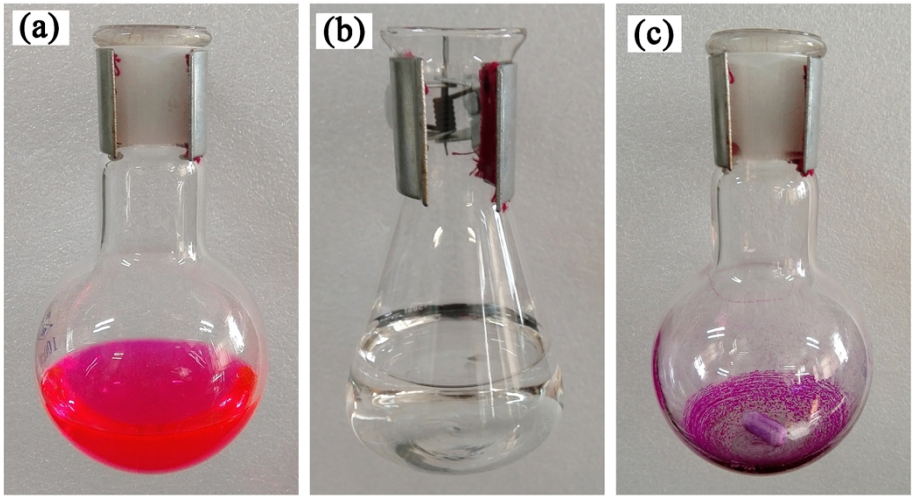

Figure S5. Photo images of (a) ethanol effluent, (b) distilled ethanol and (c) recycled Rh-B.

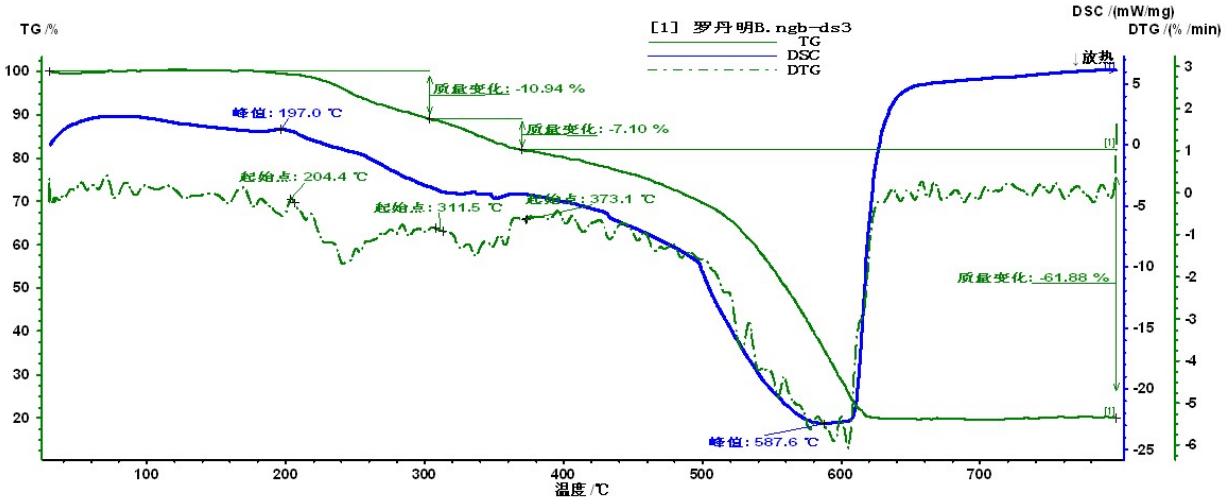

Figure S6. Thermal analysis of Rh-B in air atmosphere with a heating rate of 10 °C min^{-1}