

## Synthesis of Nanoporous carbon from waste Polymer and Potential Application in Electrochemical Energy Storage

### Abstract

Mesoporous graphene flakes and three-dimensional hollow carbon spheres/graphene flakes were selectively prepared from decomposition of waste polymer using MgO flakes and iron oxide as the templates. Through controlling the weight ratio of MgO to polymer, different graphene flakes and three-dimensional hollow carbon spheres/graphene flakes were obtained. The electrochemical properties of obtained graphene flakes and three-dimensional hollow carbon spheres/graphene flakes were investigated in detail. As electrode materials of supercapacitor and lithium ion battery, the prepared mesoporous flakes and three-dimensional hollow carbon spheres/graphene flakes showed improved electrochemical performance. The present method paved the way for the treatment of waste polymer in the future.

### References

- [1] Yanliang Wen, Jie Liu, Jiangfeng Song, Jiang Gong, Hao Chen, Tao Tang, RSC Adv., 5 (2015) 105047
- [2] Qianqian Li, Kun Yao, Guangchun Zhang, Jiang Gong, Ewa Mijowska, Krzysztof Kierzek, Xuecheng Chen, Xi Zhao, and Tao Tang, Part. Part. Syst. Charact. 32 (2015), 874–879.

### Figures

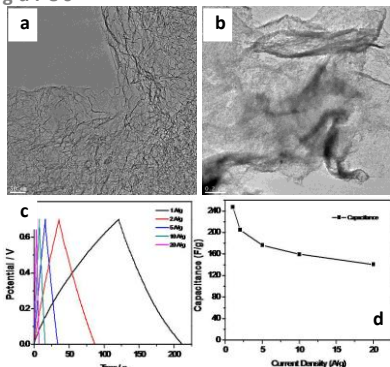


Figure 1: TEM images of graphene flakes from waste polymer (a) and (b) MnO<sub>2</sub> nanorods supported on graphene flakes. (c) Galvanostatic

charge/discharge curves of GF/MnO<sub>2</sub> composites collected at different current densities. (d) Specific capacities with different current densities. (5 M KCl as the electrolyte).

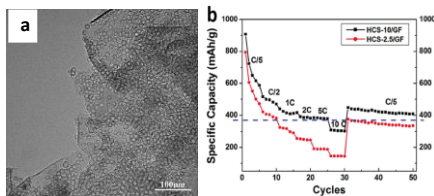


Figure 2: (a) TEM image of hollow carbon spheres/graphene flakes (b) Rate performance of hollow carbon spheres/graphene flakes used as anode materials of lithium ion battery.