

Functionalization of few-layered graphene with MnO₂ for Li battery performance

Malgorzata Wojtoniszak, Ryszard J. Kalenczuk, Xuecheng Chen, Ewa Borowiak-Palen

Westpomeranian University of Technology in Szczecin, Department of Nanotechnology, Pulaskiego 10
70-322 Szczecin, Poland
mwojtoniszak@zut.edu.pl

Carsten Jähne, Rüdiger Klingeler,
University of Heidelberg, INF 227, 69221 Heidelberg, Germany

2D graphene due to its electrical properties has been investigated for nanoelectronic applications, including lithium ion batteries. It was proved that it exhibits an enhanced lithium storage capacity as anodes in lithium-ion cells and good cyclic performance [1-3]. Moreover, MnO₂/Graphene composite displays almost three times higher capacitance compared to the pristine graphene [4]. Here, we present a synthesis method of MnO₂/Graphene composite, where MnO₂ nanocrystals are deposited on few-layered graphene. The crystal formation is a result of redox reaction of KmnO₄ and oleic acid at the oleic acid/water interface at room temperature, according to the method of Yan et al. [5]. The material was characterized by means of high resolution transmission electron microscopy (HR-TEM) and EDX as its mode, Raman spectroscopy, XRD and TGA. Electrochemical properties of the material are currently under investigation.

References

- [1] Guoxiu Wang, Xiaoping Shen, Jane Yao, Jinsoo Park. Carbon 47, **8** (2009) 2049
- [2] Minghui Liang, Linjie Zhi. J. Mater. Chem. 19, **33** (2009) 5871
- [3] Caiyun Wang, Dan Li, Chee O. Too, Gordon G. Wallace. Chem. Mater. 21, **13** (2009) 2604
- [4] Jun Yan, Zhuangjun Fan, Tong Wei, Weizhong Qian, Milin Zhang, Fei Wei. Carbon 48, **13** (2010) 3825
- [5] Hongmin Chen, Junhui He, Changbin Zhang, Hong He. J. Phys. Chem. C. 111, **49** (2007) 18033