Graphene Research Activities

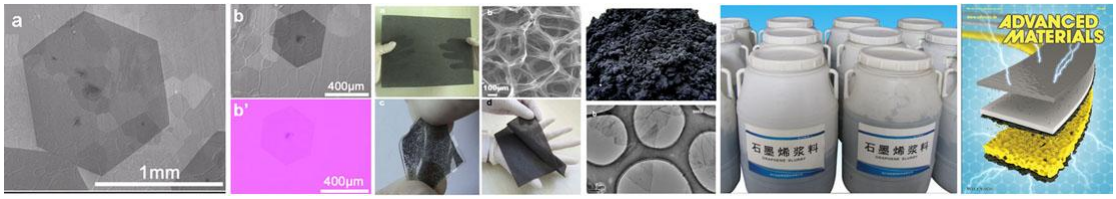
at the Institute of Metal Research, Chinese Academy of Sciences

Wencai Ren

Shenyang National Laboratory for Materials Science, Institute of Metal Research, Chinese Academy of Sciences, Shenyang 110016, P.R. China

wcren@imr.ac.cn

The Advanced Carbon Division at the Institute of Metal Research, Chinese Academy of Sciences, is a research pioneer on graphene in China, and mainly focuses on the synthesis of graphene materials and their applications such as energy storage, functional coatings, composites, and flexible optoelectronics. It has developed a novel method to produce high-quality graphene materials in a large quantity and at low cost [1], realized CVD growth of millimeter-size graphene single crystals [2,3], large-area transparent conductive films [4] and highly conductive three-dimensional interconnected graphene networks [5]. It has extensively explored the applications of these materials in lithium ion batteries [6-8], lithium sulfur batteries [9], supercapacitors [10-12], thermal management, conductive inks, anti-corrosion coatings, and composites. In addition to fundamental research, it has also made great efforts to industrialize and commercialize graphene materials in collaboration with companies, and the large-scale production of graphene is now an industrial reality.



Selective publications:

[1] S.F. Pei, W.C. Ren, H.M. Cheng et al., A method to synthesize high-quality graphene materials, **Chinese Patent 201110282370.5**.

[2] L.B. Gao, W.C. Ren, H.M. Cheng, et al., Repeated growth and bubbling transfer of graphene with millimetre-size single-crystal grains using platinum, ***Nature Communications*** 3, 699, 2012.

[3] T. Ma, W.C. Ren, H.M. Cheng, et al., Edge-controlled growth and kinetics of single-crystal graphene domains by chemical vapor deposition, ***PNAS*** 110 (51), 20386-20391, 2013.

[4] L.B. Gao, W.C. Ren, H.M. Cheng, et al., Efficient growth of high-quality graphene films on Cu foils by ambient pressure chemical vapor deposition, ***Applied Physics Letters*** 97 (18), 183109, 2010.

[5] Z.P. Chen, W.C. Ren, H.M. Cheng, Three-dimensional flexible and conductive interconnected graphene networks grown by chemical vapour deposition, ***Nature Materials*** 10 (6), 424-428, 2011.

[6] Z.S. Wu, W.C. Ren, H.M. Cheng, et al., Graphene anchored with Co_3O_4 nanoparticles as anode of lithium ion batteries with enhanced reversible capacity and cyclic performance. ***ACS Nano*** 4 (6), 3187-3194, 2010.

[7] Z.S. Wu, W.C. Ren, H.M. Cheng, et al., Doped graphene sheets as anode materials with superhigh rate and large capacity for lithium ion batteries, ***ACS Nano*** 5 (7), 5463-5471, 2011.

[8] N. Li, W.C. Ren, F. Li, H.M. Cheng, et al., Flexible graphene-based lithium ion batteries with ultrafast charge and discharge rates, ***PNAS*** 109 (43), 17360-17365, 2012.

[9] G.M. Zhou, S.F. Pei, F. Li, H.M. Cheng, et al., A graphene-pure-sulfur sandwich structure for ultrafast, long-life lithium-sulfur batteries, ***Advanced Materials*** 26 (4), 625-631, 2014.

[10] Z.S. Wu, W.C. Ren, H.M. Cheng, et al., Anchoring hydrous RuO_2 on graphene sheets for high-performance electrochemical capacitors. ***Advanced Functional Materials*** 20 (20), 3595-3602, 2010.

[11] Z.S. Wu, W.C. Ren, H.M. Cheng, et al., High-energy MnO_2 nanowire/graphene and graphene asymmetric electrochemical capacitors, ***ACS Nano*** 4 (10), 5835-5842, 2010.

[12] D.W. Wang, F. Li, W.C. Ren, H.M. Cheng*, et al., Fabrication of graphene/polyaniline composite paper via in situ anodic electropolymerization for high-performance flexible electrode, ***ACS Nano*** 3 (7), 1745-1752, 2009.