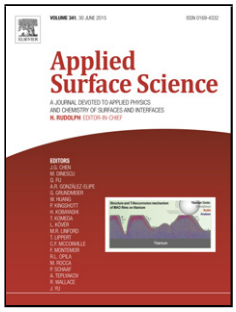

Title: Effect of oxidation degree on the synthesis and adsorption property of magnetite/graphene nanocomposites

Author: Kun Luo Yuanying Mu Peng Wang Xiaoteng Liu

PII: S0169-4332(15)02502-7
DOI: http://dx.doi.org/doi:10.1016/j.apsusc.2015.10.083
Reference: APSUSC 31564

To appear in: *APSUSC*

Received date: 6-4-2015
Revised date: 12-10-2015
Accepted date: 14-10-2015

Please cite this article as: K. Luo, Y. Mu, P. Wang, X. Liu, Effect of oxidation degree on the synthesis and adsorption property of magnetite/graphene nanocomposites, *Applied Surface Science* (2015), http://dx.doi.org/10.1016/j.apsusc.2015.10.083

Effect of oxidation degree on the synthesis and adsorption property of magnetite/graphene nanocomposites

Kun Luo[1*], Yuanying Mu[1], Peng Wang[1], Xiaoteng Liu[2*]

1. Guangxi Key Laboratory of Universities for Clean Metallurgy and Comprehensive Utilization of Nonferrous Metal Resources, College of Materials Science and Engineering, Guilin University of Technology, 12 Jiangan Road, Guilin 541004, P R China

2. School of Chemical Engineering and Advanced Materials, Newcastle University, Merz Court, Newcastle upon Tyne, NE1 7RU, UK

Abstract

A facile approach is demonstrated to synthesize a series of magnetite/graphene nanocomposites by solvothermal method, which can be easily collected after removal of pollutants without secondary pollution of graphene powders. Raman and FT-IR analyses show that the reduction of the mixing vapor of ammonia and hydrazine at different reaction periods generates the discrepancy of oxidation degree for reduced graphene oxide (rGO), which can be kept after the solvothermal synthesis of Fe_3O_4/rGO nanocomposites. Batch adsorption experiments indicate that the nanocomposite with maximum oxidation degree of rGO presents the largest magnetization of 35.4 emu g^{-1} and adsorption capacity of 59.2 mg g^{-1} for Cu^{2+}, while the one with minimum oxidation degree exhibits the strongest adsorption of 39.0 mg g^{-1} for methylene blue accompanied with appropriate magnetization of 9.0 emu g^{-1}, and only 23 per cent of initial capacity was lost after 7 recycling use. The adsorption kinetics of the both composites follows the pseudo-second-order model, suggestive of physical and