

6th Regional Symposium on Electrochemistry of South-East Europe

11 - 15 June 2017
Balatonkenese, Hungary



Book of Abstracts



RSE-SEE

Sponsored by:



Our exhibitors



Our sponsors



All rights are reserved for the organisers of 6th RSE-SEE Conference, except the right of the authors to (re)publish their materials wherever they decide. This book is a working material for the RSE-SEE 2017.

The professional and grammatical level of abstracts is the authors' responsibility.

6th RSE-SEE Conference

Book of abstracts

Edited by: Róbert Hohol

Supervised by: György Inzelt, Győző Láng, Tamás Pajkossy, Soma Vesztergom

Conference Secretariat

Diamond Congress Ltd.

H-1015 Budapest, Csalogány u. 28.

Phone: +36 1 214 7698

Fax: +36 1 201 2680

E-mail: hoholr@diamond-congress.hu

<http://rse-see2017.hu>

ISBN 978-615-5270-33-8

P2 FM05

Reduction of graphene oxide by using phenolic compounds from olive leaf extract

Denis Sačer, Gabrijela Radić, Matea Vrdoljak, Nataša Stankir, Marijana Kraljić Roković

University of Zagreb, Faculty of Chemical Engineering and Technology, Zagreb

Marulićev trg 19, 10000 Zagreb, Croatia

mkralj@fkit.hr

Since its discovery, graphene, the two-dimensional sheet of sp² bonded carbon atoms has received significant attention. Based on its excellent electrical, mechanical and thermal properties with a wide range of potential applications there is constant need for its production in bulk quantities. Although developed methods [1, 2] which use standard strong reducing agents bring good results, there is constant need for less hazardous, less toxic and more economic chemicals. There are reports on green routes which use reducing agents such as green tea, ascorbic acid or vitamin C, baker's yeast or amino acids [3].

In this work simple and green chemistry route for the preparation of reduced graphene oxide (rGO) was studied. It was shown that graphene oxide (GO) can be successfully reduced by using phenolic compounds present in olive leaf extract (OLE). The phenolic compounds present in OLE are especially interesting because high amounts of water containing phenolic compounds are generated in olive oil production process. Therefore phenolic compounds could be used as cheap, easy available and green alternative for GO reduction.

In this work graphene oxide reduction process was carried out by using two different methods. The first method was carried out in open air at temperature of 80°C during five hours and it resulted in black dispersion of rGO. In the second procedure hydrothermal method was used at temperature of 120°C and increased pressure. As a result of increased pressure reduced graphene sheets were assemble into macroscopic aerogel which facilitated isolation of the product as well as its characterisation and electrochemical testing.

The structural properties of the rGO samples were characterized by FT-IR spectroscopy and thermogravimetric analysis (TGA). Structural and morphological studies demonstrate that the part of the oxygen functionalities in GO can be removed effectively by using this process. Capacitive properties of the obtained rGO are determined by using cyclic voltammetry (CV) and electrochemical impedance spectroscopy (EIS) techniques.

References:

- [1] K. S. Kim, Y. Zhao, H. Jang, S. Y. Lee, J. M. Kim, K. S. Kim, J. H. Ahn, P. Kim, J. Y. Choi, B. H. Hong. *Nature* 457 (2009) 706
- [2] X. Li, X. Wang, L. Zhang, S. Lee, H. Dai, *Science* 319 (2008) 1229
- [3] Zhang J, Yang H, Shen G, Cheng P, Zhang J, Guo S., *Chem Commun* 46 (2010) 112