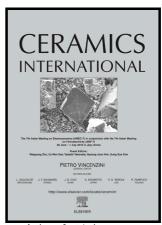
### Author's Accepted Manuscript

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www.elsevier.com/locate/ceri

PII: S0272-8842(17)30088-3

DOI: http://dx.doi.org/10.1016/j.ceramint.2017.01.076

Reference: CERI14538

To appear in: Ceramics International

Received date: 19 October 2016 Revised date: 14 January 2017 Accepted date: 14 January 2017

Cite this article as: Jin Koo Kim, Gi Dae Park, Jung Hyun Kim, Jong Hwa Kir and Yun Chan Kang, Electrochemical properties of amorphous GeO<sub>x</sub>-Composite microspheres prepared by a one-pot spray pyrolysis process *Ceramics International*, http://dx.doi.org/10.1016/j.ceramint.2017.01.076

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### **ACCEPTED MANUSCRIPT**

# Electrochemical properties of amorphous $GeO_x$ -C composite microspheres prepared by a one-pot spray pyrolysis process

Jin Koo Kim<sup>a</sup>, Gi Dae Park<sup>a,b</sup>, Jung Hyun Kim<sup>a</sup>, Jong Hwa Kim<sup>b</sup>, Yun Chan Kang<sup>a\*</sup>

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\*Corresponding author. Tel: (+82) 2-3290-3268. Fax: (+82) 2-928-3584. yckang@korea.ac.kr **Abstract** 

Amorphous GeO<sub>2</sub>-GeO-C (GeO<sub>x</sub>-C) composite powders, containing a small amount of the GeC phase, are prepared by a one-pot spray pyrolysis process. The GeO<sub>x</sub>-C composite powders have a completely spherical shape and are non-aggregated. The Ge 3d components in the XPS spectrum of the composite occupy 53.3, 40.1, and 6.6 % of the total for GeO<sub>2</sub>, GeO, and GeC, respectively. The amount of amorphous carbon in the GeO<sub>x</sub>-C composite powder is estimated at 18.3 %, based on the TG and XPS analysis. The initial discharge and charge capacities of the GeO<sub>x</sub>-C composite powders at a current density of 1 A g<sup>-1</sup> are 1873 and 908 mA h g<sup>-1</sup>, respectively. The discharge capacities of the GeO<sub>x</sub>-C composite and commercial GeO<sub>2</sub> powders for the 1200<sup>th</sup> cycle are 723 and 169 mA h g<sup>-1</sup>, respectively, and their corresponding capacity retentions from the 2<sup>nd</sup> cycle are 70.1 and 19.0 %, respectively. The high structural stability of the composite during repeated lithium insertion and desertion processes results in excellent long-term cycling performance.

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