

# **Tungsten Oxide Coated Graphite Anode Material for High Rate Capability Lithium-Ion Battery.**

Dong Jae Chung<sup>a</sup>, Dae Sik Kim<sup>a</sup>, Hojae Jung<sup>a</sup>, and Hansu Kim<sup>a,\*</sup>

<sup>a</sup>*Department of Energy Engineering, Hanyang University, 222 Wangsimni-ro, Seongdong-gu, Seoul, 04763, Republic of Korea. \*E-mail : khansu@hanyang.ac.kr (corresponding author)*

E-mail : mydongja@hanyang.ac.kr

As demands for electric vehicles (EV) and mobile electronics are increased, energy storage device becomes important. Lithium ion Battery (LIB), currently one of the most promising solution to EV, has critical issue in terms of fast charging problem. Graphite material, used as anode materials for LIB, has prominent limitation in term of high rate capability. To overcome this limitation, many materials have been reported for alternative of commercialized graphite material. Herein, we prepared tungsten oxide coated graphite by facile sol-gel reaction. The prepared tungsten oxide coated graphite showed enhanced the high rate capability of LIB. Without any reversible capacity fading, the tungsten oxide coated graphite anode electrode showed an outstanding rate capability of 90.28 % of the capacity retention at a rate of 1800 mA g<sup>-1</sup> compare to that tested at a rate of 72 mA g<sup>-1</sup>. In further characterization, microstructure and electrochemical performance of the tungsten oxide coated graphite will be discussed in more detail.