Ordered Mesoporous Carbon Electrodes for Li-O-2 Batteries

By: Park, JB (Park, Jin-Bum)[1] ; Lee, J (Lee, Jinwoo)[3] ; Yoon, CS (Yoon, Chong Seung)[2] ; Sun, YK (Sun, Yang-Kook)[1,4]

View ResearcherID and ORCID

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Abstract

Ordered mesoporous carbon (OMC) with highly ordered pore channels was applied as an oxygen-side electrode for a Li-O-2 battery. To evaluate the effect of the pore channel size on battery performance, we employed OMCs possessing two different pore sizes (6 and 17 nm). When cycled at a current density of 200 mA g(carbon)(-1), the OMC electrodes reduced polarization in the oxygen evolution reaction by 0.1 V compared to those consisting of conventional super P carbon electrode. X-ray diffraction and transmission electron microscopy of the discharged oxygen electrodes provided evidence for the formation of amorphous Li2O2, a product of the oxygen reduction reaction, inside the OMC pores rather than on the electrode surface as in the case of the super P electrode. The OMC electrodes were also effective at high current densities (500 mA g(carbon)(-1) and 1000 mA g(carbon)(-1)).

Keywords

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Author Information

Reprint Address: Sun, YK (reprint author)

+ Hanyang Univ, Dept Energy Engn, Seoul 133791, South Korea.

Addresses:

+ [1] Hanyang Univ, Dept Energy Engn, Seoul 133791, South Korea
+ [2] Hanyang Univ, Dept Mat Sci & Engn, Seoul 133791, South Korea
+ [3] Pohang Univ Sci & Technol POSTECH, Dept Chem Engn, Pohang 790784, Kyungbuk, South Korea
- [4] King Abdulaziz Univ, Fac Sci, Dept Chem, Jeddah, Saudi Arabia
  Organization-Enhanced Name(s)
  King Abdulaziz University

E-mail Addresses: yksun@hanyang.ac.kr

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