

UPDATE FROM THE CUTTING EDGE

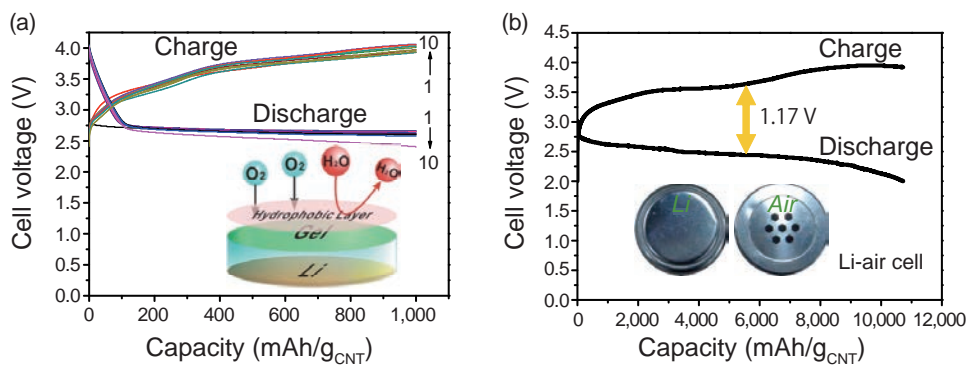
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The abstracts of the recent research information appearing in Vol.13 No.1-3 of "AIST TODAY" are introduced here, classified by research areas. For inquiry about the full article, please contact the author via e-mail.

Environment and Energy

Li-air batteries using a gel and an ionic liquid Li-air battery based on gel air electrode with superior passages of electron, ion and oxygen

We have developed a cross-linked network gel (CNG) based on carbon nanotubes (CNTs) and ionic liquid (IL), which can be utilized as three dimensional tri-continuous passages for electron, lithium ion and oxygen gas. As a consequence, the Li-O₂ cell using the CNTs/IL CNG and the corresponding IL electrolyte exhibited an unprecedented specific capacity of about 6,000 mAh/g_{CNT} at current of 200 mA/g_{CNT}. Furthermore, a reversible 10 cycle process with 1,000 mAh/g_{CNT} and large discharge and recharge capacities of about 10,000 mAh/g_{CNT} have been also achieved even in ambient air by alleviating the H₂O contamination. It extends the Li-O₂ batteries into Li-air batteries.



(a) The discharge/charge curves of the Li-air cell with a cross-linked network gel electrode in ambient air when the state of discharge was limited to 1,000 mAh/g_{CNT}
(b) The discharge/charge curves of the Li-air cell in ambient air, at 200 mA/g_{CNT}

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