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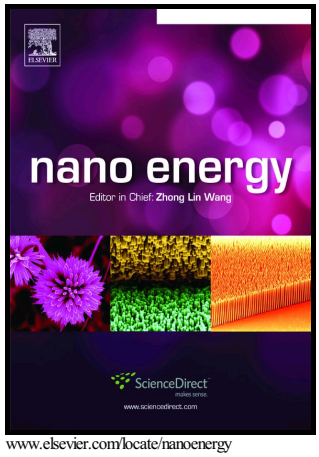

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Operando observations of RuO_2 catalyzed Li_2O_2 formation and decomposition in a Li-O_2 micro-battery

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Abstract

RuO_2 displays excellent bifunctional catalysis towards the oxygen reduction and evolution reactions of Li-O_2 battery. Nevertheless, how the solid catalyst successively catalyzes solid Li_2O_2 formation and decomposition, confronting passivation and loss of RuO_2/Li_2O_2 contact, during discharging and charging remains a mystery. Here we report operando observations of RuO_2 catalyzed oxygen reduction and evolution reactions of Li_2O_2 by utilizing a liquid cell scanning transmission electron microscope. Upon discharging, RuO_2 obviously accelerates formation of soluble LiO_2 intermediates and acts as preferential sites of Li_2O_2 precipitation. During charging, the catalytic activation of RuO_2 takes place at electrolyte-RuO_2-Li_2O_2 triple-phase