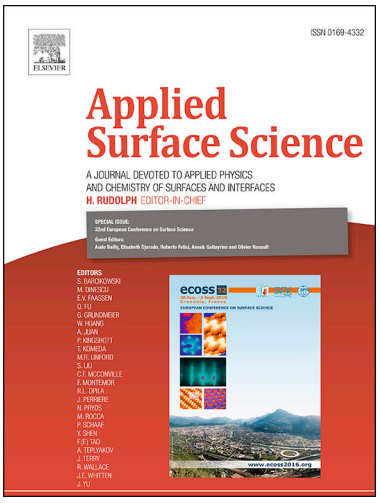

Full Length Article

Tangerine peel-derived carbon supported manganese oxides catalyst for oxygen reduction reaction

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Title Page

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Tangerine peel-derived carbon supported manganese oxides catalyst for oxygen reduction reaction

Abstract:

Controllable growth of uniform nanoparticles with specific morphology to obtain high active electrocatalyst is a key common problem in developing efficient energy conversion and storage devices. In this work, a tangerine peel-derived carbon (TPC) supported mixed manganese oxides (MnO_x/TPC) was synthesized for oxygen reduction reaction (ORR) through a facile pyrolysis procedure. By making full use of the confinement effect of tangerine peel cells, the MnO_x nanoparticles of MnO_x/TPC-800 are obtained with a components of Mn(II), Mn(III) and Mn(IV) with cubic morphology of about 15 nm and evenly dispersed on the TPC surface. Electrochemistry measurements show that MnO_x/TPC-800 demonstrates excellent ORR performance with a comparable half-wave potential to commercial Pt/C and a high onset potential with a dominant $4e^-$ catalytic process, superior stability, and remarkable immunity to methanol crossover effect in alkaline media. The synergy effect between multi-oxidation states MnO_x and TPC of MnO_x/TPC-800 is proved to play significant factor for its high ORR performance. This study provides a valuable and rational strategy to construct morphology-controlled metal nanoparticles with unique carbon materials in developing cost-effective catalysts for fuel cells and metal air batteries.

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