Effect of manganese oxides on the performance of lithium-air battery

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Lithium-air batteries are more and more considered to be a promising high-energy-density device since they were first actual tested successfully by Abraham in 1996 [1-4]. Although there still are some critical challenges to be overcome, it is very significant to find novel catalysts with high electro-catalytic efficiency for lithium-air batteries. In this paper, we compared 3 kinds of manganese oxides such as commercial MnO_2, Birnessite-type MnO_2 nannosphere, and α-MnO_2 nanowire on the electrochemical performance for lithium air batteries, and studied the electrochemical performance of manganese oxides on the lithium air battery at different discharge-charge current density. Discharge and charge curves are shown in Fig.1, which revealed that α-MnO_2 nanowire superior to others. The highest initial discharge capacity achieved 1091.60 $mAh\cdot g^{-1}$ at 0.10 $mA\cdot cm^{-2}$ discharging to 2.0V and a charge specific capacity of 1423.80 $mAh\cdot g^{-1}$ charging to 4.5V by the α-MnO_2 nanowires catalyst. Meanwhile it was found that the discharge potential platform is 2.70V and the charge potential platform is 4.10V.

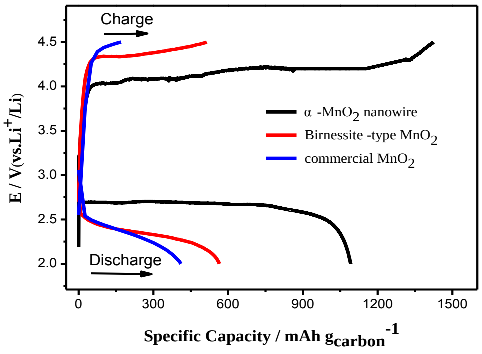

Fig.1 The initial discharge and charge curves of α-MnO_2 nanowire, Birnessite-MnO_2 nanosphere and commercial MnO_2 at the current density of 0.10 $mA\cdot cm^{-2}$.

References

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Acknowledge

The work described in this paper was fully supported by a Grant from the 863 program of China (Project No. 2012AA110302), a Grant from new century excellent talents in university (Project No.NCET-09-0215) and a Grant from National Natural Science Foundation of China (51172023).