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Study of composite catalyst in Zn-air battery efficiency

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Metal-air air batteries, especially zinc-air batteries, are widely used as a high capacity primary power source because of their advantages, such as, being light weight, having high energy density and portability[1,2]. Gas diffusion electrode design has important effect on battery performances[3].
In this study cathode catalyst prepared by composite and blending of catalyst and graphene oxide, and compared with each other. Cathode electrode Zn-air battery consist of 18% KOH, 52.5% graphite merck, 10% PTFE, 7% CMC and 12.5% catalyst. Two types of catalysts were comprised. The first catalyst was mixture of MnO_2 and graphene oxide but the second one was composite of MnO_2 and graphene oxide. Graphene oxide was synthesized by modified hummer's approach and composite was synthesized by graphite, $KMnO_4$, H_2SO_4 and $MnSO_4$.
The synthesis of composite catalyst were confirmed by XRD and SEM. These catalysts were assembled by other parts (separator, steel mesh, …) to construction of battery. To investigation of efficiency of assembled batteries, chronopotentiometry method was done in 2, 5 and 10 mA. The results showed that capacity of battery with blend catalyst correspond to 2, 82 and 257, and capacity with composite catalyst were 7.160, 269.3 and 400.12 mAh/g, respectively. These results indicated the performance of composite catalyst was higher than that blend catalyst to cathode electrode of Zn-air battery.

References

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