Activity Tuning of Ferrite Nanoparticles towards Oxygen Reduction Reaction for Zn-air Batteries

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The continuously growing gap between the energy requirement and availability has put metal-air batteries and fuel cells as strong substitute to the conventional energy storage and harvesting sources. Among the various green energy devices the metal-air batteries such as Zn-air batteries are promising with high energy and power densities. Though the Zn-air batteries have desirable features, the penetrability of these batteries in the energy market is highly dependent on cost and efficiency of the device. Since electrodes of these systems are the major hurdles that affect the cost and efficiency of the devices, in recent days, a significant level of attention has been given to develop economically more viable alternatives of the state-of-the-art systems. Here the ferrite based materials have showed the considerable activity and stability as air electrode. Further, the doping of the ferrite with other transition metals seems to be effective strategies to enhance the device efficiency. The composites of spinel cobalt ferrite nanoparticles with the high surface area carbon such as graphene performs remarkably for oxygen reduction reaction and delivers outstanding energy and power density in the Zn-air batteries. Moreover, substitution of other transition metal in the ferrite

have significant enhancement in the activity. In the real system demonstration the substation in the ferrite has improved the battery performance. Herein, we have demonstrated composite of ferrite and graphene as effective catalyst for air electrode in Zn-air battery.