

Joint event on

WORLD CONGRESS ON SMART MATERIALS AND STRUCTURES

&

3rd International Conference on

POLYMER CHEMISTRY AND MATERIALS ENGINEERING

November 21-22, 2019 | Singapore



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Improving anode utilization of Mg-air batteries

Due to the self-corrosion of Mg, a Mg-air battery has a rather low anode utilization rate. In order to improve the anode utilization, work was done to test different methods such as hot rolling, alloying with indium, as well as modifications of electrolyte and air cathode with reduced graphene oxide (RGO). For batteries with a commercial air cathode and a 3.5% NaCl electrolyte, utilization rates of hot-rolled Mg-6Al anode and Mg-6Al-1In anode are 39% and 52% at a current density of 10 mA cm⁻², respectively, higher than 36% of as-cast Mg-6Al anode. When electrolyte was modified with a water soluble poly (sodium 4-styrenesulfonate)/RGO, and air cathode was prepared with an RGO/Mn₃O₄ nanometer composite, an

anode utilization of 82 % has been achieved with a Mg-6Al-1In anode. At the same time, an energy density of 1620 Wh kg⁻¹ has been obtained, much higher than those achieved with a NaCl electrolyte and a commercial air cathode (1115 Wh kg⁻¹ and 52%). These results were discussed together with SEM findings of anodes after discharge.

Biography

Guangxin Wang received his PhD from University of Bremen, Germany in 1990. Since then, he has been working as a materials scientist in Germany, USA and China. Right now, he is a professor of Henan University of Science and Technology, China. He has published a book and over 90 technical papers.

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