Facile Solvothermal Synthesis of 3D Biocooh Architectures for High-Performance Photo-Supercapacitor and Water Splitting Applications

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Abstract

In this present work, we synthesized a three dimensional (3D) BiOCOOH micro flowers by a solvothermal approach and applied to photosupercapacitor application for the first time. When it is used as electrode material for photosupercapacitor, the BiOCOOH material shows long cycling stability (5000 cycles) during the continuous charge-discharge process. This improvement in the cycle life of the BiOCOOH material is ascribed to its highly stable three dimensional structures. The as-prepared BiOCOOH exhibits a maximum specific capacitance value of 140 Fg^{-1} and outstanding cycle life with maximum specific capacitance retention of about 78% after 5000 cycles. This rational synthesis provided an effective strategy to enhance the photosupercapacitor performance towards commercial application. With the good electrical conductivity, and outstanding specific surface area, the as-prepared BiOCOOH electrode presents great potential for high performance applications. The 3 wt% Pt modification of the BiOCOOH generates 441 µmol g^{-1} h^{-1} of H_2, upon 5 h illumination.

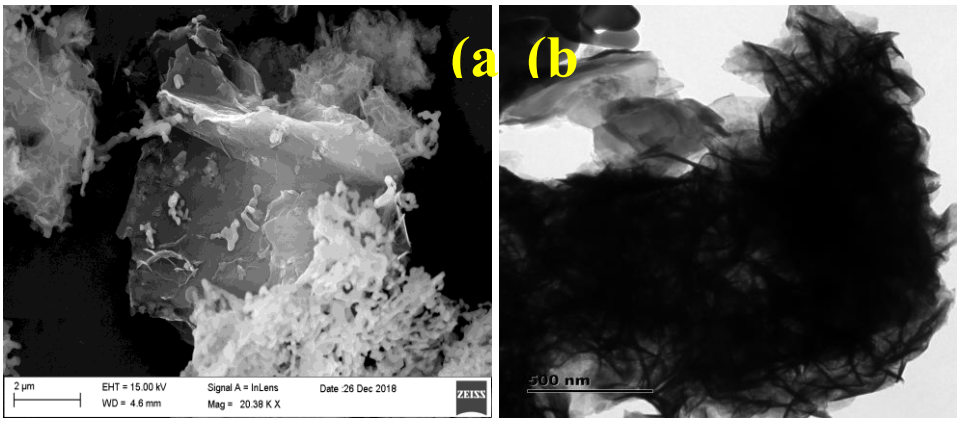

Fig.1 SEM and TEM images of BiOCOOH composites