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Hierarchical growth of $MnCo_2S_4$ nanoflakes on conducting substrate as a multifunctional electrode

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Recently transition metal chalcogenides have attracted much attention as electrode/electrocatalyst material for different energy storage and conversion applications. In the present study hierarchical interconnected manganese cobalt-sulfide ($MnCo_2S_4$) nanoflakes were effectively deposited on conducting substrate by electrodeposition method followed by ion-exchange. The 3D-nature of conducting substrate facilitates the directional growth, exposing more active sites of the active material for electrochemical reactions at the electrode-electrolyte interface. The binder free electrode used as electrode/electrocatalyst for different applications such as Li-ion battery, supercapacitor, water splitting and methanol oxidation application. The $MnCo_2S_4$ electrode/electrocatalyst exhibits superior electrochemical performance with better stability, mainly attributed to the higher electrochemical surface area, superior electrode/electrolyte contact offers fast ion diffusion and low electron transfer resistance. The present synthesis approach can open new era for large-scale applications of the novel materials for different electrochemical applications. This work was supported by Basic Science Research Program through the National Research Foundation of Korea (NRF) funded by the Ministry of Education (NRF 2016R1D1A1B03930855).

Biography

Harsharaj S. Jadhav received his Ph.D degree from Chonnam National University, Gwangju, South Korea in 2015 and currently working as research professor at Myongji University, South Korea. During Ph.D, he worked on protected lithium electrode and different cathode materials for Li-air battery. Currently his research interest is in synthesis of several nanomaterials and composites for energy storage and conversion applications such as secondary batteries (Li-ion, Li-S, Metal-air), supercapacitors and fuel cells.

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