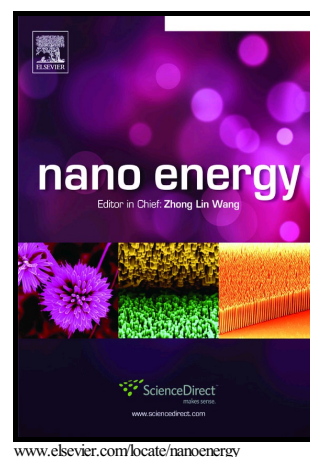


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# Large-scale hierarchical oxide nanostructures for high-performance electrocatalytic water splitting

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## Abstract

There is a growing interest in oxide nanocrystal based electrocatalysts for overall water splitting. Despite tremendous efforts, large-scale fabrication of highly-active and durable oxide electrocatalytic electrodes remains as a great challenge. Herein, we report a fast and general strategy for manufacturing a series of hierarchical nanostructured metal oxides ( $\text{MO}_x$ ,  $\text{M} = \text{Ti}, \text{Mn}, \text{Fe}, \text{Co}, \text{Ni}, \text{Cu}, \text{Mo}, \text{Ag}, \text{Sn}, \text{W}$  and  $\text{NiFe}$ ) as electrocatalysts by laser ablation on corresponding metal substrates. Particularly, the  $\text{NiO}$  nanocrystal electrocatalysts ( $\sim 3$  nm) grown on Ni plates have been directly employed as highly active and stable bifunctional electrodes for both hydrogen evolution and oxygen evolution reactions, by taking advantage of its large surface area, rich defects, high hydrophilicity and aerophobicity. The facile laser

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<sup>1</sup> These authors contributed equally to this work

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