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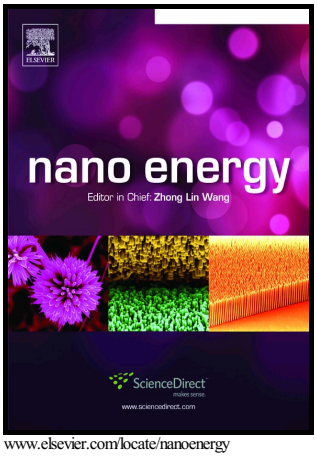

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PII: S2211-2855(17)30804-2
DOI: https://doi.org/10.1016/j.nanoen.2017.12.029
Reference: NANOEN2410

To appear in: *Nano Energy*

Received date: 3 November 2017
Revised date: 27 November 2017
Accepted date: 17 December 2017

Cite this article as: Lili Zhao, Qing Cao, Aili Wang, Jiazhi Duan, Weijia Zhou, Yuanhua Sang and Hong Liu, Iron Oxide Embedded Titania Nanowires - an Active and Stable Electrocatalyst for Oxygen Evolution in Acidic Media, *Nano Energy,* https://doi.org/10.1016/j.nanoen.2017.12.029

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Abstract

The hydrogen evolution reaction (HER) catalysts with high activity and stability in acid electrolyte are widely reported. However, the abundant, active and acidic stable catalysts for the oxygen evolution reaction (OER) are scarce to build the two-electrodes for water splitting. Fe-based materials are promising candidate electrocatalysts for OER in alkaline electrolyte, but unstable in acid electrolyte. Herein, some amount of iron oxides are incorporated into titanium dioxide nanowires (Fe-TiO_x LNWs/Ti) by ion substitution and followed calcination process. The obtained Fe-TiO_x LNWs/Ti lead to a moderate improved stability (81.3% vs. 33.3% for Fe_2O_3 loaded on Ti foam at the same potential of 1.9 V vs. SCE for 20 h), and remain high activity for OER (a low onset potential of 1.49 V vs. RHE at 1 mA cm^{-2}) in acid electrolyte. This study opens up the possibility and universality of active and abundant nonprecious metal oxides for OER utilized in acid electrolytes.