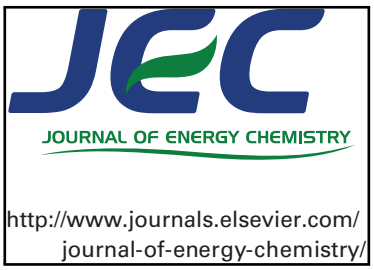

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PII: S2095-4956(18)30024-X
DOI: 10.1016/j.jechem.2018.01.020
Reference: JECHEM 527

To appear in: *Journal of Energy Chemistry*

Received date: 9 January 2018
Accepted date: 27 January 2018

Please cite this article as: Yinhua Lv , Bing Cai , Yihui Wu , Shubo Wang , Qike Jiang , Qingshan Ma , Jingyue (Jimmy) Liu , Wen-Hua Zhang , High Performance Perovskite Solar Cells Using TiO_2 Nanospindles as ultrathin mesoporous layer , *Journal of Energy Chemistry* (2018), doi: 10.1016/j.jechem.2018.01.020

High Performance Perovskite Solar Cells Using TiO_2 Nanospindles as ultrathin mesoporous layer†

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Abstract

Single crystal anatase TiO_2 nanospindles (NSs) with highly exposed {101} facets were synthesized and employed as electron transport materials (ETM) in perovskite solar cells (PSCs). Time-resolved photoluminescence (TRPL) spectra revealed that the TiO_2 NSs are more effective than TiO_2 nanoparticles in accepting electrons from perovskite. Moreover, the TiO_2 nanospindles further endowed the PSCs with good reproducibility and supressed hysteresis. The best device with TiO_2 NSs as ETM yielded power conversion efficiency (PCE) of 19.6%, demonstrating that the home-made TiO_2 NSs is a good ETM for PSCs.

Key words: Electron transport material, Perovskite solar cell, TiO_2 nanospindles, Ultrathin mesoporous layer

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This work was supported by the National Natural Science Foundation of China (Grand No. 21773128), key research and development projects of Sichuan Province (Grand No. 2017GZ0052), National Postdoctoral Program for Innovative Talents (BX201600138), and Anshan Hifichem Co. Ltd.

1. Introduction