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PII: S2095-4956(18)30024-X
DOI: [10.1016/j.jechem.2018.01.020](https://doi.org/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 TiO₂ Nanospindles as ultrathin mesoporous layer , *Journal of Energy Chemistry* (2018), doi: [10.1016/j.jechem.2018.01.020](https://doi.org/10.1016/j.jechem.2018.01.020)

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High Performance Perovskite Solar Cells Using TiO₂ Nanospindles as ultrathin mesoporous layer†

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Abstract

Single crystal anatase TiO₂ 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 TiO₂ NSs are more effective than TiO₂ nanoparticles in accepting electrons from perovskite. Moreover, the TiO₂ nanospindles further endowed the PSCs with good reproducibility and suppressed hysteresis. The best device with TiO₂ NSs as ETM yielded power conversion efficiency (PCE) of 19.6%, demonstrating that the home-made TiO₂ NSs is a good ETM for PSCs.

Key words: Electron transport material, Perovskite solar cell, TiO₂ 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

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