

Accepted Manuscript

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PII: S0169-4332(18)32263-3
DOI: <https://doi.org/10.1016/j.apsusc.2018.08.127>
Reference: APSUSC 40164

To appear in: *Applied Surface Science*

Received Date: 3 July 2018
Revised Date: 15 August 2018
Accepted Date: 17 August 2018

Please cite this article as: W. Kim, D. Monllor-Satoca, W-S. Chae, M.A. Mahadik, J. Suk Jang, Enhanced Photoelectrochemical and Hydrogen Production Activity of Aligned CdS Nanowire with Anisotropic Transport Properties, *Applied Surface Science* (2018), doi: <https://doi.org/10.1016/j.apsusc.2018.08.127>

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Enhanced Photoelectrochemical and Hydrogen Production Activity of Aligned CdS Nanowire with Anisotropic Transport Properties

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ABSTRACT

Various solar conversion materials with 1D nanostructure have been developed and are being widely investigated for various solar fuel generation applications. In this study, aligned and non-aligned CdS nanowires (NWs) were synthesized on Cd foil or in solution via solvothermal processes. In the case of aligned CdS NWs, the relative intensity of the (002) diffraction peak was higher than that of the non-aligned CdS NWs, which indicated that the NWs grew preferentially in the (001) direction. The systematic comparison between the photoelectrochemical properties of both electrodes revealed that the aligned CdS NW electrode displayed markedly enhanced photocurrent (by a factor of 7), photoelectrochemical hydrogen production (by a factor of 10), and photostability in comparison with those of the non-aligned

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