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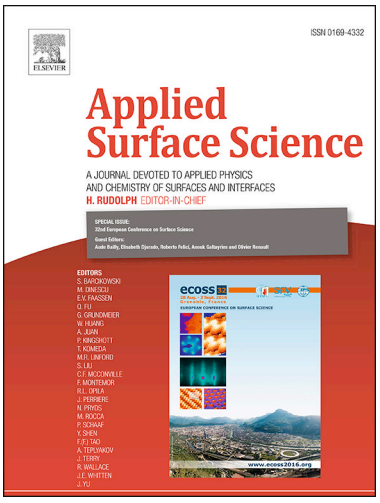

Full Length Article

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PII: S0169-4332(18)32249-9
DOI: https://doi.org/10.1016/j.apsusc.2018.08.113
Reference: APSUSC 40150

To appear in: *Applied Surface Science*

Received Date: 26 March 2018
Revised Date: 26 July 2018
Accepted Date: 13 August 2018

Please cite this article as: X. Xi, C. Yang, H. Cao, Z. Yu, J. Li, S. Lin, Z. Ma, L. Zhao, GaN nanocolumns fabricated by self-assembly Ni mask and its enhanced photocatalytic performance in water splitting, *Applied Surface Science* (2018), doi: https://doi.org/10.1016/j.apsusc.2018.08.113

GaN nanocolumns fabricated by self-assembly Ni mask and its enhanced photocatalytic performance in water splitting

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Highlights

1. GaN nanocolumns with different diameters were fabricated by Inductively coupled plasma using self-assembly Ni mask.
2. The absorption property of GaN nanocolumns was investigated by the PL spectrum and detailed mechanism was analyzed according to the data.
3. The GaN nanocolumns showed excellent photocatalytic activity.
4. A model was put forward to explain the relation between the photocatalytic property and the GaN diameters.

Keywords: GaN; nanocolumns; water splitting

Abstract: We investigate the influence of Gallium Nitride (GaN) nanocolumns on the water splitting. The results show that with the GaN nanocolumns diameters decreasing from 250 to 170 nm, the photocurrents for the water splitting increase from 0.12 to 0.29 mA/cm^2. The highest photocurrent is ~ 2.8 times higher than that of the planar GaN. The increase is mainly related to the surface states, which will lead to a band bending and help to separate the photo-generated carriers more effectively.