

Enhanced Self-powered UV Photoresponse of
Ferroelectric BaTiO₃ Materials by Pyroelectric
Effect

Nan Ma, Ya Yang



PII: S2211-2855(17)30519-0
DOI: <http://dx.doi.org/10.1016/j.nanoen.2017.08.043>
Reference: NANOEN2157

To appear in: *Nano Energy*

Cite this article as: Nan Ma and Ya Yang, Enhanced Self-powered UV Photoresponse of Ferroelectric BaTiO₃ Materials by Pyroelectric Effect, *Nano Energy*, <http://dx.doi.org/10.1016/j.nanoen.2017.08.043>

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting galley proof before it is published in its final citable form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.

Enhanced Self-powered UV Photoresponse of Ferroelectric BaTiO₃ Materials by Pyroelectric Effect

Nan Ma^{a,b}, and Ya Yang^{a,b*}

^a*Beijing Institute of Nanoenergy and Nanosystems, Chinese Academy of Sciences, Beijing, 100083, P. R. China.*

^b*CAS Center for Excellence in Nanoscience, National Center for Nanoscience and Technology (NCNST), Beijing, 100083, P. R. China.*

*To whom correspondence should be addressed: Email: yayang@binn.cas.cn.

ABSTRACT: Ferroelectric material BaTiO₃ (BTO) with intrinsic spontaneous polarization demonstrates excellent pyroelectric effect that output current/voltage signals can be observed even by slight temperature fluctuation. Here, we report a self-powered 365 nm UV light photodetector by using the light-induced pyroelectric effect in Ag/BTO/Ag device with the response time of about 0.5 s at the rising edge. Moreover, the heating-induced pyroelectric effect has been utilized to enhance the 365 nm light response, where both the corresponding photoconductive gain and responsivity can be dramatically enhanced by larger than 1200% under a temperature variation rate of 2.1 K/s as compared with that of UV light illumination. Our study proposes a feasible method to enhance the 365 nm light response by coupling light and heating-induced pyroelectric effect in BTO, which has potential applications in thermal energy scavenging and self-powered sensor systems.

KEYWORDS: BaTiO₃, self-powered, UV photodetector, pyroelectric effect, energy scavenging

Download English Version:

<https://daneshyari.com/en/article/5451863>

Download Persian Version:

<https://daneshyari.com/article/5451863>

[Daneshyari.com](https://daneshyari.com)