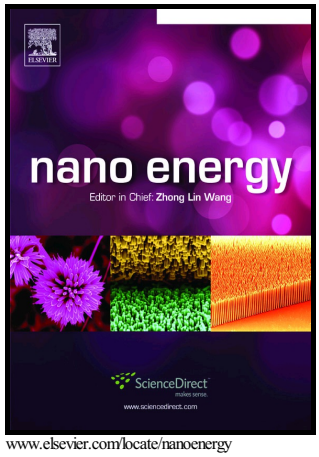

www.elsevier.com/locate/nanoenergy

Enhanced Self-powered UV Photoresponse of Ferroelectric $BaTiO_3$ 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 $BaTiO_3$ Materials by Pyroelectric Effect, *Nano Energy,* http://dx.doi.org/10.1016/j.nanoen.2017.08.043

Enhanced Self-powered UV Photoresponse of Ferroelectric $BaTiO_3$ 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.

ABSTRCT: Ferroelectric material $BaTiO_3$ (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: $BaTiO_3$, self-powered, UV photodetector, pyroelectric effect, energy scavenging