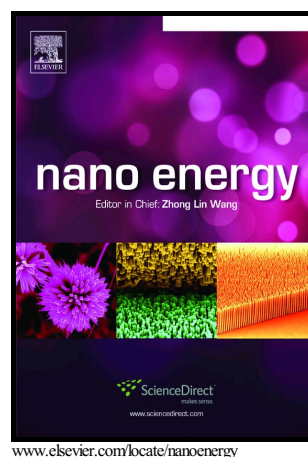


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On enhancing capability of tribocharge transfer of ZnO nanorod arrays by Sb doping for anomalous output performance improvement of triboelectric nanogenerators

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Abstract

Triboelectric nanogenerator (TENG) is an emerging green energy alternative, but the still low output power has been plagued by incomplete visualization into surface chemistry of materials. As an effective way of modifying surface chemistry for semiconductors by doping, we demonstrate that ZnO nanorod (NR) arrays doped into p-type with Sb can drastically enhance the output performance of TENG. The p-type characters of all the Sb-doped are confirmed and the hole carrier concentration is estimated to range from 2.83×10^{15} to $1.87 \times 10^{18} \text{ cm}^{-3}$. Surprisingly, the output voltage and current of p-type ZnO NR arrays are remarkably enhanced from undoped n-type ZnO by 24 and 5.5 times, respectively, in giving up electrons to negatively charged PDMS. Contrarily, the triboelectric output performance of ZnO NR arrays is degraded

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