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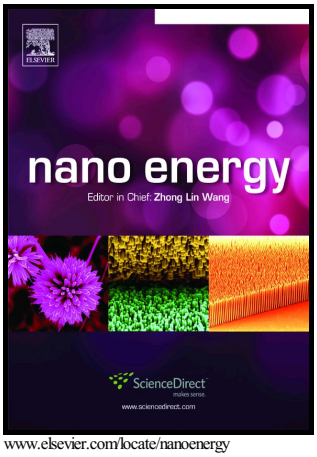


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# Nanofluidic Electric Generators Constructed from Boron Nitride Nanosheet Membranes

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**Abstract**

Harvesting clean energy through artificial devices has attracted tremendous interest in the past few decades. More specifically, electricity generated by electrokinetic effects has received much attention recently due to the development of microfluidic and nanofluidic device. In this paper, we have developed a novel power-generating device based on membranes made of boron nitride (BN) nanosheets. The hydrated BN membrane contains intra-layer spacing between individual BN nanosheets, which can form nanofluidic channels to accommodate water molecules and ions. This novel device with a membrane area of 5 $mm^2$ generates a large current of 12.1 nA in 0.1 M NaCl solution with a pressure gradient of 5 kPa, and reaching a maximum output power of 3.2 pW. Furthermore, multiple devices can be connected and operated simultaneously to increase the current output, which is promising for future clean energy harvesting devices.

**Keywords**: 2D materials, boron nitride, membrane, nanofluidic, electrokinetic energy generation

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