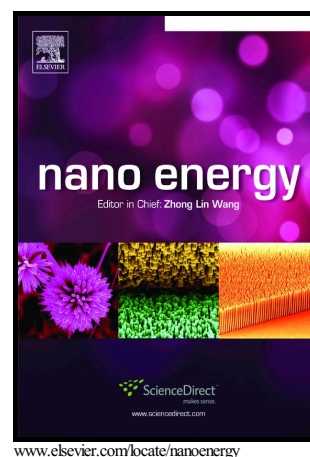


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Self-powered ammonia nanosensor based on the integration of the gas sensor and triboelectric nanogenerator

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Abstract

A new self-powered ammonia (NH₃) nanosensor with flexibility, portability, good selectivity and sensitivity has been developed from conducting polyaniline nanofibers (PANI NFs) based triboelectric nanogenerator (TENG). The power supply and gas sensor have been successfully integrated into one device. The PANI NFs with NH₃ sensing property work both as a frictional layer and an electrode in the TENG. The TENG shows high output performance with the maximum short current circuit of 45.70 μA and output voltage of 1186 V in air, while its output voltage is obviously reduced in varying degrees after being exposed to NH₃ with different concentrations, resulting from the change of electroconductivity of PANI, which is the design principle of the NH₃ sensor. Meanwhile, this NH₃ nanosensor exhibits good selectivity and sensitivity with the limit detection of 500 ppm at room temperature.

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