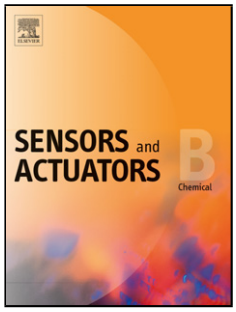

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$PrFeO_3$ hollow nanofibers as a highly efficient gas sensor for acetone detection

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Highlights:

- $PrFeO_3$ hollow nanofibers were successfully prepared via electrospinning.
- Applied $PrFeO_3$ hollow nanofibers to gas-sensing for the first time.
- Our sample could detect 10 ppm acetone at 180 °C.
- The sensor with rapid response time (5 s) and recovery time (5 s).

Abstract

In this study, the perovskite praseodymium ferrite ($PrFeO_3$ hollow nanofibers) was successfully synthesized via a facile electrospinning and calcination procedure. The structure, elemental composition and morphology were investigated by XRD, EDX, SEM and TEM. And the results of BET indicated that samples had a large specific surface area (33.74 m^2/g) with mesoporous characteristics. The most importantly is that the gas sensor based on $PrFeO_3$ hollow nanofibers possessed high response value, good selectivity and good long-time stability at a low operating temperature of 180 °C, even exposed to 10 ppm acetone, the sensor still delivered a response to be 6. Those good properties made it become the promising candidates for practical detectors to acetone.

Keywords: Electrospinning; $PrFeO_3$; Acetone; Perovskite materials; Gas sensors