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# Gas sensors based on ZnO/silk fibroin film for nitrogen dioxide detection under UV light at room temperature

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## ABSTRACT

In this work, a novel gas sensor based on ZnO/silk fibroin (ZnO/SF), which was synthesized by the hydrothermal method, was proposed for efficient and fast detection of NO<sub>2</sub> gas under the irradiation of 365 nm UV-light at room temperature. The prepared ZnO/SF sensor activated by UV showed a high sensing response of about 85 towards 20 ppm NO<sub>2</sub> gas at room temperature with an average response and recovery time of 26s and 16s, respectively. Test results of 1ppm, 5ppm, 10ppm, 20ppm NO<sub>2</sub> gas indicated that the ZnO/SF sensor had a very excellent response and linearity. Additionally, the sensing mechanism was analyzed as well.

Keywords: Sensors, Electronic materials, ZnO/SF, UV illumination, Room temperature

## 1. Introduction

ZnO, one of the most critical n-type semiconductors, has been widely utilized in the fields of gas sensors<sup>[1-3]</sup>. However, most traditional heat-treatment gas sensors work at a temperature between 200°C and 500°C. To some extent, the high operation temperature

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