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Influence of metal (W, Pd)-doping on gas sensing properties of the NiO flower-like thin films for o-xylene detection

Ghazale Khorshidi, Mahdi Behzad, Hamideh Samari Jahromi, Ebrahim Alaei



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1 **Influence of metal (W, Pd)-doping on gas sensing properties of the NiO flower-like**  
2 **thin films for o-xylene detection**

3 Ghazale Khorshidi<sup>1</sup>, Mahdi Behzad<sup>1\*</sup>, Hamideh Samari Jahromi<sup>2</sup>, Ebrahim Alaei<sup>2</sup>

4 1. Department of chemistry, Semnan University, Semnan 35351-19111, Iran

5 2. Research Institute of Petroleum Industry (RIPI), Environment and Biotechnology

6 Division, West Blvd., Azadi Sports Complex, P.O. Box 14665-1998, Tehran, Iran

7  
8 **ABSTRACT**

9 Undoped NiO, W-doped NiO and Pd-doped NiO nanoflowers were prepared by  
10 hydrothermal, or precipitation method using NiSO<sub>4</sub>, WCl<sub>6</sub> and PdCl<sub>2</sub> as precursor  
11 compounds. The characterizations and microstructural analyses were performed by  
12 powder X-ray diffraction (PXRD), field emission scanning electron microscopy  
13 (FESEM), and energy dispersive X-ray analysis (EDAX). Thin films of these materials  
14 were prepared and the gas adsorption properties of the prepared thin films were  
15 investigated towards o-xylene vapor. The influence of doping on o-xylene adsorption  
16 was studied. To this intent, thin films were deposited by dip-coating on quartz substrates  
17 and fixed onto the end of an optical fiber. This device worked in reflection mode, and  
18 transduction took place in the light that traveled through the core of the fiber. W-doped  
19 NiO exhibited superior performance to o-xylene compared to the other two samples.  
20 The response time, sensitivity and recovery time for undoped NiO, W-doped NiO and  
21 Pd-doped NiO thin films towards o-xylene were found as (~50 s, 0.08 and ~5 min),

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\* Corresponding author email: [mbehzad@semnan.ac.ir](mailto:mbehzad@semnan.ac.ir), [mahdibehzad@gmail.com](mailto:mahdibehzad@gmail.com)

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