Gas Sensors Based on Laser-Ablated Nanomaterials

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Nanomaterials prepared via laser ablation in liquid (LAL) are known to be applied in several fields, including such as electronics, catalysis and photocatalysis, biomedicine, optics and optoelectronics, energy related technologies and so on [1]. As LAL products are often semiconductor metal oxides (or metal sulfides) with unique morphology and surface defects, such materials may also be attractive as components for chemiresistive gas sensors. Nevertheless, to date, only a few attempts were made to exploit LAL-generated nanomaterials as gas sensors [2,3]. Niu and co-workers showed sensing of ethanol and acetone by hollow ZnS nanoparticles [2]. Later, Xiao *et al*. used LAL-produced WO_3 nanoflakes to make a device that sensed ethanol at 150 ^oC [3]. No devices working at room temperature were reported.

In this work, we fabricated gas sensors based on ZnO and SnO_x nanomaterials prepared by means of ns- and ms- pulsed lasers in water. We show that such nanomaterials can demonstrate selective and sensitive gas sensing at room temperature [4,5]. Figure 1 presents ZnO nanoparticles prepared by ns-pulsed laser in water (a) and their dynamic response curve towards ethanol (b) recorded at room temperature.

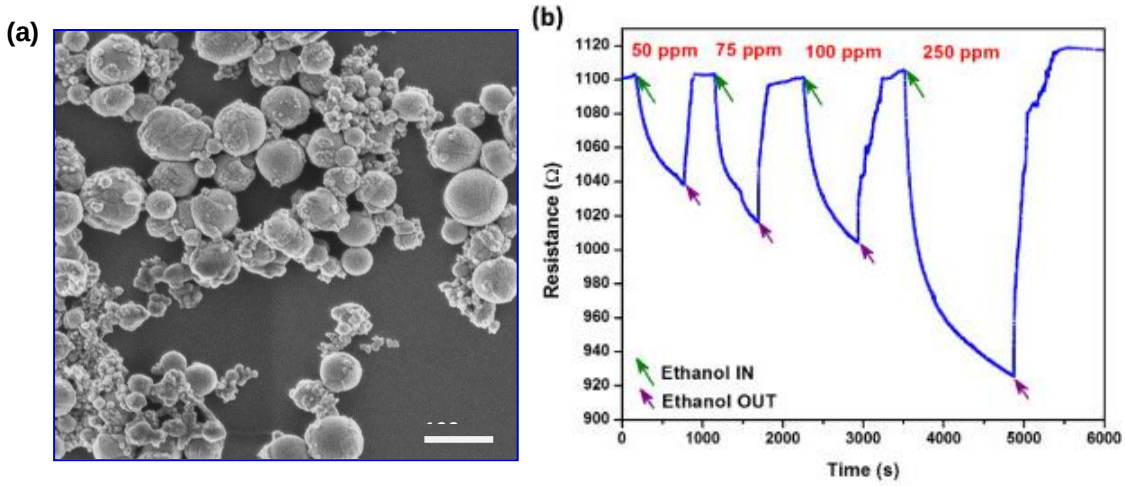

Figure 1. (a) SEM image of ZnO nanoparticles produced by ns-laser in water medium and (b) dynamic response curve of sensor device based on such nanoparticles towards ethanol at room temperature [4].

References:

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