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# Acetone Gas Sensing Properties of Multiple-networked Pd-decorated $\text{Bi}_2\text{O}_3$ Nanorod Sensors

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## Abstract

This study examined the sensing properties of Bi<sub>2</sub>O<sub>3</sub> nanorods decorated with Pd nanoparticles. Pd-decorated Bi<sub>2</sub>O<sub>3</sub> nanorods were prepared by immersing the Bi<sub>2</sub>O<sub>3</sub> nanorods in ethanol/(50 mM) PdCl<sub>2</sub> solution followed by UV irradiation and annealing. The Bi<sub>2</sub>O<sub>3</sub> nanorods decorated with Pd nanoparticles showed faster and stronger response to acetone gas than the pristine Bi<sub>2</sub>O<sub>3</sub> nanorods. Interestingly, the difference in response time between the Pd-decorated Bi<sub>2</sub>O<sub>3</sub> nanorod sensor and pristine Bi<sub>2</sub>O<sub>3</sub> nanorod sensor increased with increasing the acetone gas concentration. In contrast, the difference in recovery time between the two nanorod sensors decreased with increasing the acetone gas concentration. This difference can be explained using the chemical mechanism. The underlying mechanism for the enhanced response of the Bi<sub>2</sub>O<sub>3</sub> nanorods decorated with Pd nanoparticles to acetone gas is also discussed.

## [Citing Literature](#)

### Number of times cited: 1

- Seung Jin Ryu, Eric Arifin, Shin Woo Ha and Jin Kyu Lee, On-site Colorimetric Forensic Sensor (I): Quantitative Detection of Toxic HS and NH<sub>3</sub> Gases Using Metal Ion-modified Silica Powders *Bulletin of the Korean Chemical Society*, **36**, 10, (2434-2439), (2015).  
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