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Highly sensitive room-temperature acetone gas sensor based Ag-loaded ZnO nanoflowers

Highly-sensitive room-temperature operable gas sensors based on photocatalytic activity of Ag-loaded ZnO nanostructures are demonstrated as a possible candidate for sub-ppm acetone detection. Characterizations indicate that Ag nanoparticles are well deposited on the surface of hierarchical flowerlike ZnO nanostructures. To utilize the room-temperature operable gas sensor, Ag-loaded ZnO nanoflowers based chemiresistive-type structure is activated by an ultraviolet (UV) light illumination. The gas sensors show high sensitivity and excellent stability toward 100 ppm acetone gas at the optimized operating UV intensity of 5 mW/cm2, which are approximately 5 times higher than that of pure ZnO. Moreover, sub-ppm detection of acetone with low-level of 200 ppb is possible realized by Ag-loaded ZnO nanoflower. These results make it a potential candidate material for developing as an excellent acetone gas sensing element of diabetes monitoring system.

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