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WO_3 Crystals and Their NO_2-Sensing Properties

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WO_3 film sensors with various crystalline morphologies have been investigated for highly sensitive detection of dilute NO_2. Four types of WO_3 particles, spherical, disk, cuboid, and hexagonal, were prepared by pyrolysis (spherical), precipitation method (disk), and hydrothermal synthesis under different conditions (cuboid and hexagonal). WO_3 film sensors were fabricated on Au comb-type microelectrodes by suspension dropping using the various WO_3 powders obtained, and their sensor properties to dilute NO_2 were investigated at 200°C. The cuboid WO_3 film sensor showed the best response-recovery property with 90% response and 90% recovery times of 1.3 and 0.9 min to 0.05 ppm NO_2 at 200°C, respectively. The hexagonal WO_3 film sensor showed extremely high sensitivity of 41.1 to 0.01 ppm NO_2 at 200°C. The sensor performance suggested the possibility of environmental monitoring of dilute NO_2 using WO_3 film sensors.

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