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Research Article

Highly Sensitive InO_x Ozone Sensing Films on Flexible Substrates

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Abstract

InO_x thin films with a thickness of the order of 100 nm were grown by dc magnetron sputtering on glass, Si and flexible (PET) substrates. The electrical conductivity of InO_x thin films exhibited a change of two orders of magnitude during photoreduction with ultraviolet light and subsequent oxidation in ozone concentrations from 2370 to 15 ppb, at room temperature. Optical transparency of over 85% for all substrates was maintained. Film structural and ozone sensing properties were analyzed. Surface morphology investigations carried out by SEM for films on PET substrates showed extended surface cracking for bending angles beyond 40°. Optimization of growth conditions has led to films with extremely low detection levels for ozone down to 15 ppb at room temperature, demonstrating the wide prospective of utilizing these metal oxides as gas sensors on flexible substrates for a variety of automotive and air-conditioning applications.

Abstract

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