Abstract:

The effects of in situ-deposition temperature and post-deposition annealing on the microstructure of the sputtered SnO2 thin film are studied. These effects on the performance of the resulting gas-sensing devices have been characterized. For in situ-deposition temperature, the film was deposited on a heated substrate, while for post-deposition annealing, the film was deposited on an unheated substrate and then annealed it at various temperatures. Microstructure changes in SnO2 film were induced at various temperatures. Both films of in situ heating and post-annealing evoked only partial crystallization, especially at low temperatures, and the crystallinity was enhanced with high temperatures. SEM images confirmed that the grains and pores of the film changed with the thermal treatment. In consequence of the post-annealing, the pores grew wider; however, they grew narrow in the case of in situ heating. The film annealed at low temperature yielded high-response device to NO2 gas compared with that annealed at higher temperature. The sensing devices fabricated by in situ deposition showed highest response.

Published In:

Applied Physics A , NULL , NULL