

A simple and high effective tellurium based sensor for NO₂ detection

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Abstract

A simple and stable NO₂ gas sensor device with rapid response/recovery time and low operating temperature has been developed using polycrystalline tellurium. The effect of thickness of the sample, thermal treatment and temperature to sensitivity against NO₂ is presented for the first time. The sensitivity strongly increases with thickness of the film decreasing, especially at thickness less than 100 nm. Thermal treatment of the films (at temperatures greater than 100/spl deg/C) and increasing of operating temperature above 80/spl deg/C result in decrease of sensitivity to NO₂, while it strongly improves the response and recovery times. By conditions of best compromise between the main sensing parameters, achieved at operating temperature 50/spl deg/C, there are no noticeable drifts of baseline or of gas induced current. The sensing mechanism is explained by interaction of adsorbed species with lone-pair electrons, which form the upper part of the valence band.