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Porous NiO nanosheets self-grown on alumina tube using a novel flash synthesis and their gas sensing properties

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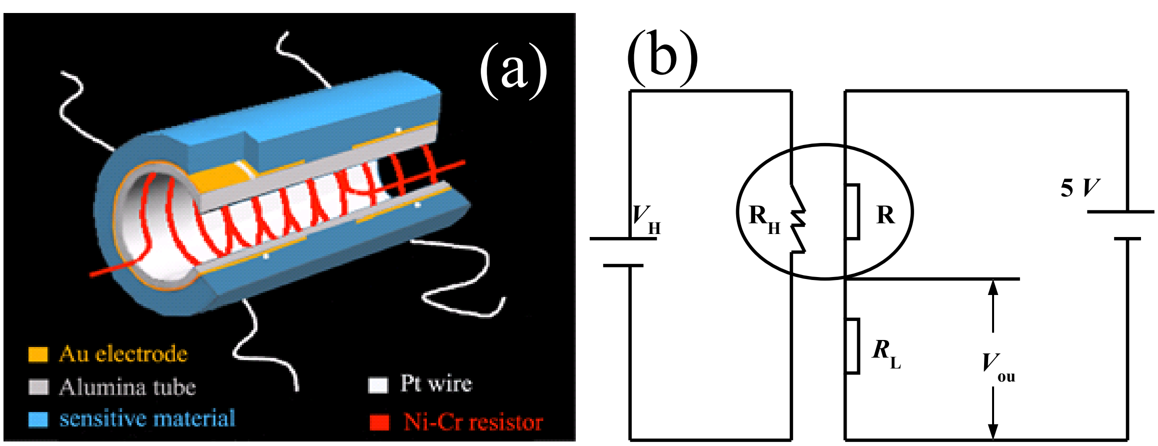

Fig. S1 (a) the schematic structure of a completed gas sensor including the alumina tube, a pair of Au electrode, the platinum wires, the Ni-Cr resistor, and the sensitive material, and (b) the basic testing principle of the gas sensor test (see following for clarity).

According to Fig. S1, the electrical resistance of sensor can be obtained as following:

$$R = \frac{5 - V_{out}}{V_{out}} \cdot R_{\mathrm{L}}$$

Where R is the resistance of the sensor, R_{L} is a constant load resistance unchanged with the surrounding gas partial pressure, V_{out} is the sensor export voltage. The gas response β was defined as the ratio of the electrical resistance in air (R_{a}) to that in gases (R_{g}):

$$R_a = \frac{5 - (V_{out})_{\mathrm{air}}}{(V_{out})_{\mathrm{air}}} \cdot R_{\mathrm{L}}\ , \quad R_{\mathrm{g}} = \frac{5 - (V_{out})_{\mathrm{g}}}{(V_{out})_{\mathrm{g}}} \cdot R_{\mathrm{L}}\ , \quad \beta = \frac{R_{\mathrm{a}}}{R_{\mathrm{g}}}$$

where $(V_{\mathrm{out}})_{\mathrm{air}}$ is the export voltage in air, and $(V_{\mathrm{out}})_{\mathrm{gas}}$ is in gases