MEASURING APPROACH FOR SEMICONDUCTOR NANOSTRUCTURED GAS SENSORS PARAMETERS

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Extended Abstract

The development of new technologies for extracting and testing the parameters of nanostructures based on semiconductor oxides required the development of special instruments for measuring the parameters of such structures [1], in particular, measuring the temperature dependences of their electrical resistances. The small size of the nanostructures determines the restrictions imposed on the permissible values of currents, voltages, and powers that can be applied to such nanostructures [2]. Classical resistance measurement methods, for example, a multimeter, voltmeter and ammeter [3], as a rule, apply rather high voltages and currents to the measured element, which can change their properties with respect to nanostructures, distort the measurement results or lead to failure.

The main objective of this work is to provide the ability to measure high resistances of micro- and nanostructures using differential amplifiers of general purpose [4]. The task was achieved by the fact that to determine the resistance of nanostructured sensors, the voltage of the reference voltage source and the voltage at the additional resistor, which is connected in series with the measured resistance of the nanostructure, are used. The input resistance of the measuring amplifier can be significantly less than the resistance of the nanostructures.

The proposed method for measuring the resistances of nanostructured sensors makes it possible to apply the minimum values of currents and voltages to the studied nanostructured sensors [5-6].

The result consists in eliminating the influence of the input resistances of instrumental amplifiers on the measurement results and replacing them with general-purpose amplifiers with relatively small input resistances.

Keywords: *nanostructured semiconductor oxides, gas sensors, gas concentration*

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