2. Nanocomposites and nanomaterials

Influence of Temperature on Conductivity of SiO_x and SiO_2(Si) Films for Temperature Sensor

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Nowadays sensors of various physical quantities are increasingly used in the global information and control systems. Sensors are used in industrial control, automation of production processes in automotive, aviation and rail transport, rocket-space and aviation technology. Therefore, research in this area continue to be relevant today [1].

The metal-insulator-semiconductor structures with nanocomposite SiO_2(Si) film containing Si nanoclusters as the insulator were prepared. At the beginning the SiO_x films were deposited on a *n*-type silicon wafer by using the ion-plasma sputtering (IPS) method [2].

Fig. 1. Typical I-V characteristics of SiO_x film annealed at 500 C measured in temperature range from 94 K to 350 K. Arrow shows the direction of temperature growth.

To study the dependence of the electrical conductivity of the film on annealing temperature and measurements the series annealing in range 500-1100 °C and measurements of current-voltage characteristics in the range from 94 K to 350 K were made.

The value of the electrical conductivity of the films decreases with increasing annealing temperature. The essential dependence (8 orders) of current value on the temperature measurement has been revealed (Fig. 1). It gives the ability to use this material as the sensitive element of temperature sensor.

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2. *O.L. Bratus', A.A. Evtukh, O.S. Litvin, M.V. Voitovych, V.O. Yukhymchuk.* Structural properties of nanocomposite films SiO_2(Si) filmsobtained by ion-plasma sputtering and thermal annealing. Semiconductor Physics, Quantum Electronics & Optoelectronics. - 2011.- V.14, N.2.- P. 247-255.