

Resistance changes of carbon-palladium films obtained by PVD for sensor' applications

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Nanostructured carbon films containing palladium nanoparticles (of size 5-10 nm) are currently among the most promising materials for applications in the detection of hydrogen. In this article we will present the results of resistance change measurements for carbon - palladium films (C-Pd) under the influence of hydrogen.

C-Pd films are obtained by PVD process (Physical Vapour Deposition) at the Tele & Radio Research Institute. During the deposition of films precursors of fullerene C₆₀ and palladium acetate in a vacuum partial decomposition of these compounds takes place resulting in formation of a film containing a matrix of amorphous carbon, and embedded in its Pd grains [1]. Measurements of the resistance changes of these films as resist of adsorption and desorption of gas containing 1% hydrogen was carried out at atmospheric pressure. These measurements were performed in a set up prepared for this purpose. Fig.1 shows the electrical resistance R of these films as a function of time for repeated cycles of measurement. The measuring cycle is as follows: a) introduction the mixture of hydrogen - adsorption b) introduction the air - desorption. Resistance after each cycle returns to its initial value after growth, which occurs under the influence of hydrogen.

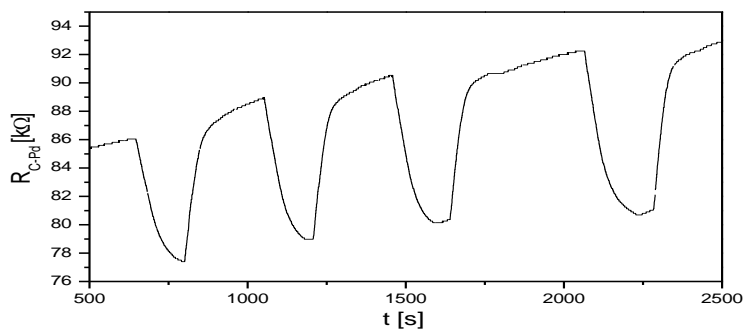


Fig. 1. Resistance changes of C-Pd films in 1% of hydrogen atmosphere as a function of time (two measuring cycles)

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[1] E.Czerwosz, M.Kozłowski, E.Kowalska, H.Wronka, J.Radomska, J.Rymarczyk, *Elektronika* 2009, Vol. 50, nr 1, 32-35