

HRTEM CHARACTERIZATION OF Pd NANOPARTICLES IN THE C-Pd COMPOSITE FILMS OBTAINED BY PVD METHOD

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High resolution transmission electron microscopy (HRTEM) studies of palladium nanograins obtained from sedimentation of solvated C-Pd film prepared by PVD method are presented.

The PVD process was originally elaborated in Tele & Radio Research Institute and procedure based on PVD process from two separated sources: one containing pure 99.95% fullerene C₆₀, and second source containing palladium acetate. In a result of the technological procedure we obtained C-Pd films on different substrates. The film was dissolved in toluene/ethanol mixture (1:1) and next the sedimentation was applied to obtain different fractions of palladium nanograins with different diameters. Next, the suspension was dried, deposited on silicon plate and annealed at 650°C in an atmosphere of argon for 30 minutes. Thus prepared samples were investigated by electron microscopy methods.

The size and structure of these Pd nanoparticles were studied with transmission electron microscopy (TEM) and scanning electron microscopy (SEM). SEM and TEM images showed uniformly distributed Pd nanoparticles with different sizes. The results of HRTEM studies of such Pd nanograins allowed for determining of classes of Pd nanograins with different diameters (below 20nm, between 20 and 100nm and above 100nm), defects and triple junction. Investigation of a fine structure of an area surrounding big and medium in size Pd nanograins exhibited existence of carbon shells. HRTEM images showed polycrystalline character of Pd nanoparticles.

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