

CREATION OF HIGHLY DISPERSE METALS ON A CARBON SUBSTRATE

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Ultra-disperse metal powders are used in the formation of materials with increased porosity (battery electrodes, fuel cells, filters and adsorbents), with a fine-grained structure, with increased mechanical properties; when modifying the properties of polymer matrices (increase in strength, wear resistance, microhardness), the growth of films with a small grain size, the creation of 3D printer pastes, as components of solid phase synthesis, for highly disperse systems with a liquid medium.

Mechanochemical synthesis of ultradisperse powders composites Ag/C was carried out in two versions.

The ultradisperse carbon in the first variant was activated with a silver powder, with the formation of the Ag/C mechanocomposite. In another case mechanocomposite Ag/C was synthesized as a result of mechanochemical reduction of silver nitrates by ultradisperse carbon.

Mechanocomposites Ag/C was studied by X-ray diffraction analysis, electron microscopy and energy dispersive X-ray spectroscopy (EDS). It is shown that the silver content in the obtained ultradispersed powders of mechanocomposites formed in both variants is in good agreement with the silver content in the initial mixtures prior to mechanical activation. The diffractograms of Ag/C mechanical composites formed in both the first and second cases coincide in practice the sizes and shapes of the particles of such mechanocomposites are very close and consist of almost spherical shape particles with dimensions from 50 to ~ 100 nm, respectively (Fig.1.).

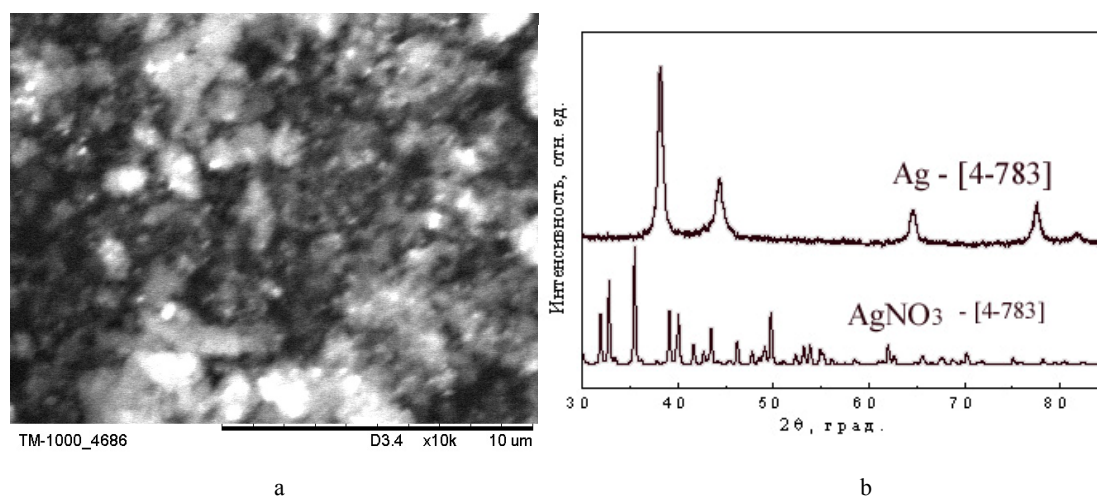


Fig. 1. Electron micrographspurified mechanocomposites Ag/C (a), magnification: a – 5000.

X-ray diffraction (b) mechanocomposites Ag/C and AgNO₃.

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