

# Nanostructured surfaces

## Amorphous carbon on thin copper layer

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Vacuum deposition was used to cover the copper layer on glass substrates with amorphous carbon ( $\alpha$ -C) thin films. It is known [1], that copper can be used as a sublayer for structuring of carbon films.

Obtained films were studied by Raman spectroscopy and absorption spectra in visible range with the Raman scattering wavelength 785 and 633 nm. The best results are obtained on copper films with electric resistivity of up to  $10 \Omega/\text{m}^2$ . The copper was deposited by electronic evaporation on glass substrate heated up to 300 °C. Such deposition method provides the best structuring of carbon films. The mechanism of carbon layers regulating depends on the thickness of deposited films. The Raman excitation spectra have a different form due to luminescence of RS excitation at 785 nm, which masked the characteristic peaks of carbon films. Under the action of light carbon films deposited on a copper substrate have strongly marked spectrum peaks and change their color and crystal structure. Absorption spectra of films have a complex form with three absorption bands in the range of 300, 420, and 630 nm. The peak at 300 nm indicates the excitation of  $n$  to  $n^*$ , peaks at 420, 600 nm is a result of plasmon-phonon interactions, which indicates the existence of crystalline clusters together with amorphous phase.

Such films can be used in sensorics and for registering information in various devices. It is established that copper film as a sublayer affects the structure of carbon films. It is also shown that the structure of thin carbon films can be modified by laser irradiation.

1. Т.Н. Василевская, С.Г. Ястребов, Н.С. Андреев, И.А. Дроздова и др. Структура пленок аморфного гидрированного углерода, легированного медью // Физика твердого тела.– 1999.– **41**. N. 11.– С. 2088-2096.