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XPS and XAS studies of diamond-like carbon films prepared by HIPIMS technique

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X-ray photoelectron spectroscopy (XPS) and x-ray absorption spectroscopy (XAS) were employed for the investigations of diamond-like carbon films prepared by HiPIMS technique. The measurements were done ex-situ, i.e. the prepared DLC samples were exposed to air during transferring from the deposition to analysis chambers. It is inevitable that the surface of the samples was contaminated by absorbed air molecules. XPS analyses revealed that the main surface contaminants are carbon and oxygen, which introduce the difficulties for the determination of carbon species in the DLC films. In this work, a complementary XAS technique was used for analyzing carbon species in the DLC films. The XAS measurements were carried out in a fluorescence mode to probe beneath the surface, avoiding collecting information from the surface contaminations. The results from the surface sensitive XPS technique will be compared with the XAS results, and the discussion will also be made.

Keyword: Diamond-like carbon; DLC; XAS; XPS; HIPIMS

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