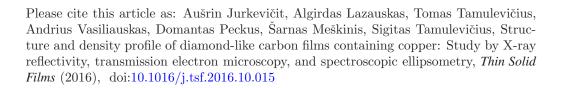
Accepted Manuscript

Structure and density profile of diamond-like carbon films containing copper: Study by X-ray reflectivity, transmission electron microscopy, and spectroscopic ellipsometry

Aušrinė Jurkevičiūtė, Algirdas Lazauskas, Tomas Tamulevičius, Andrius Vasiliauskas, Domantas Peckus, Šarūnas Meškinis, Sigitas Tamulevičius

PII:	S0040-6090(16)30602-2
DOI:	doi:10.1016/j.tsf.2016.10.015
Reference:	TSF 35539
To appear in:	Thin Solid Films
Received date:	19 May 2016
Revised date:	6 September 2016
Accepted date:	6 October 2016



This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.



ACCEPTED MANUSCRIPT

Structure and density profile of diamond-like carbon films containing copper: study by X-ray reflectivity, transmission electron microscopy, and spectroscopic ellipsometry

Aušrinė Jurkevičiūtė^a, Algirdas Lazauskas^a, Tomas Tamulevičius^{*a,b}, Andrius Vasiliauskas^a, Domantas Peckus^a, Šarūnas Meškinis^a, Sigitas Tamulevičius^{a,b}.

^aInstitute of Materials Science of Kaunas University of Technology, K. Baršausko Str. 59, LT-51423 Kaunas, Lithuania

^bPhysics Department, Kaunas University of Technology, Studentų Str.50, LT-51368, Kaunas, Lithuania

Corresponding Author

* Tel.:+370 37 313432. E-mail: Tomas.Tamulevicius@ktu.lt (Tomas Tamulevičius)

Abstract

Diamond-like carbon nanocomposite thin films containing Cu (DLC:Cu) were deposited employing high power pulsed magnetron sputtering. A mixture of argon and acetylene gases was used. Deposition conditions were varied to produce DLC:Cu nanocomposite films with different Cu content, ranging from 13.6 to 48.8 at.%. The films demonstrated multilayered structure that was characterized by energy-dispersive X-ray spectroscopy (EDS), X-ray reflectivity (XRR), transmission electron microscopy (TEM), spectroscopic ellipsometry (SE) and optical spectroscopy. The results show that tandem analysis of the results obtained by different methods for DLC:Cu nanocomposite films can be modeled as a structure having ten distinct layers. This ten-layer model was used to fit the measured SE and XRR data. The roughness and thickness of the films were measured. Information about copper content, material density, refractive index, extinction and copper volume concentration profiles in a direction normal to the surface of DLC:Cu films was obtained. The thickness values and Cu distribution along the film agreed with were found to agree well with the results obtained employing TEM, EDS and XRR, SE methods.

Download English Version:

https://daneshyari.com/en/article/5466159

Download Persian Version:

https://daneshyari.com/article/5466159

Daneshyari.com