

Carbon-copper amorphous composite coatings grown by thermionic vacuum arc method

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Abstract. Copper doped amorphous carbon composite films (a-C(Cu)) have been deposited by thermionic vacuum arc (TVA) technique, using two electron beams emitted by externally heated cathodes: applying high voltages (1-5kV) between cathodes and the two anodes (C, Cu), two bright plasma were ignited in C and Cu atoms. Chemical composition, morphology, microstructure and crystallographic properties of the films were studied by scanning electron microscopy (SEM), low-angle X-ray diffraction (XRD) and X-ray photoelectron spectroscopy (XPS). The friction property of the a-C(Cu) coatings sliding against sapphire ball in dry conditions at room temperature were investigated by an CSM ball-on-disk tribometer, revealing a minimum value of 0.19 for the friction coefficient.

Keywords: TVA, amorphous carbon, nanocomposite, XPS spectra
