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Characterizing Methodology of ta-C and hard carbon coatingsStephane NEUVILLE¹¹TCE, CUISY, France

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Characterizing of hard carbon coatings in order to be able to predict some functional properties for applications which have been considered with them, is more complex than usually admitted. The main reason is that many possible coating functions are interdependent and that many often requested coating material properties such as optical transparency, optoelectronic properties, together with scratch and wear resistance and thermal stability will only be achieved simultaneously for a much limited numbers of hard carbon categories. Furthermore, corrosion resistance depends also on adhesion, chemical inertness, coating material atomic density, thermal stability and stress. And in case of fretting corrosion should be also considered friction coefficient, surface rugosity, elasticity and wear resistance and many more. In addition, the coating characterizing should make possible the optimizing of the coating properties and insure their reproducibility. Therefore characterizing of carbon coatings should first consider the intrinsic coating material properties and the global coating properties depending also from its adhesion, thickness, uniformity, the substrate surface preparation, and stability of the interface substrate coating material. In this presentation we will review and explain the rank and the details of many more necessary characterizing steps and methods than usually employed and which provide a comprehensive analysis of the whole coating /substrate system, before starting specific application control tests. This will allow then for each considered application, some compromise in the choice of only a more limited number of selected characterizing method which for practical time and cost reasons, will be necessary to do.

Keywords

DLC

tcharacterizing

intrinsic properties

global properties

multifunctions