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Thermal degradation of hydrophobic graphite-based thin film nano-coatings observed by Raman spectroscopy.

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Abstract

Our work reports an alternative method for determining thermal degradation of graphite-based thin film hydrophobic coatings using the D and G graphite vibrations as a probe. We show that the Raman spectrum of the coating as a function of temperature is an efficient probe for detecting changes in the surface properties. Both D and G bands of graphite are sensitive to changes of the coating matrix induced by temperature. We apply the Raman technique to correlate the changes of D and G vibrations with those found by different experimental methods such as contact angle measurements and thermogravimetric analysis to characterize organosilane hydrophobic coatings.

Keywords: Raman spectroscopy, carbon-based materials, graphite, thermal degradation, hydrophobic coatings, coatings.

1. Introduction

Hydrophobic and superhydrophobic surfaces have lately attracted a huge scientific interest due to their wide range of applications. Since the discovery of the Lotus leave structure by Barthlott and Neinhuis in 1997 [1, 2], many advanced materials have been developed by mimicking the micro and nano-structures of

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