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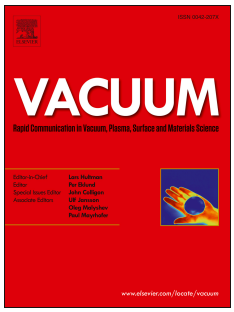

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THE INFLUENCE ON THE PERFORMANCE OF CVD DIAMOND COATINGS BY THE TREATMENT OF HYDROGEN PEROXIDE

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ABSTRACT

The influence on the performances of chemical vapor deposition (CVD) diamond coating/cemented carbide substrate was investigated through comparing the treatments of deionized water, ethanol and hydrogen peroxide after acid reaction. The surface morphology, content and composition of the treated cemented carbide were investigated by using scanning electron microscopy (SEM), energy dispersive spectroscopy (EDS) and X-ray diffraction (XRD), respectively. The as-fabricated, in different treatments, diamond coatings' quality and adhesion were detected by Raman spectroscopy and indentation testing, respectively. Moreover, the cutting performance of as-fabricated diamond coatings was studied when the pre-treatments apply to the cutting tools. The results demonstrated that the surface of the cemented carbide, treated by ethanol, precipitated out impurities like Cobalt sulfide and Cobalt sulphate which will lead to poor adhesion, and its scratch test critical load (when delamination occurred) was 27 *N*. In contrast, the other two ways have the similar better effect: their critical loads were 68 *N* and 65 *N*. And the cutting test against Al-SiC alloy indicated that the tool treated with peroxide after a chemical etching had better performance.

Keywords: diamond coating; cemented carbide; HFCVD; hydrogen peroxide

1. Introduction