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Feasible fabrication of a wear-resistant hydrophobic surface

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ABSTRACT

In this study, a novel facile method, namely liquid-phase laser ablation, was proposed to obtain a robust hydrophobic surface. The cemented carbide sample was immersed in a fluorosilane solution and ablated by laser, while controlling the distance between the top surface of sample and liquid level. Then, a surface with good hydrophobicity could be obtained by one step using this technique. The effect of different laser processing parameters on the wettability of the sample surface was studied, and the water contact-angle (WCA) and the rolling angle (RA) could reach $148.4^{\circ}\pm 0.6^{\circ}$, $4.5^{\circ}\pm 0.5^{\circ}$, respectively, which indicated excellent hydrophobicity. Moreover, we found that the hydrophobic surface fabricated by the new method was more wear-resistant than that obtained by the laser texture and fluorination treatment. The hydrophobic surface exhibited excellent mechanical abrasion resistance as it maintained hydrophobicity even after being subjected to mechanical abrasion by hand-polishing 600 times with 1200 grit metallographic sandpaper. Moreover, the

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