

Accepted Manuscript

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PII: S0032-5910(18)30532-1
DOI: doi:[10.1016/j.powtec.2018.07.035](https://doi.org/10.1016/j.powtec.2018.07.035)
Reference: PTEC 13517
To appear in: *Powder Technology*
Received date: 12 March 2018
Revised date: 5 July 2018
Accepted date: 9 July 2018

Please cite this article as: Chenlong Wei, Jigui Cheng, Jianfeng Li, Wenchao Chen, Pengqi Chen, Laima Luo, Junwu Liu , Tungsten-coated diamond powders prepared by microwave-heating salt-bath plating. Ptec (2018), doi:[10.1016/j.powtec.2018.07.035](https://doi.org/10.1016/j.powtec.2018.07.035)

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Tungsten-coated diamond powders prepared by microwave-heating salt-bath plating

Chenlong Wei,^{a,b} Jigui Cheng,^{a,b*} Jianfeng Li,^{a,b}

Wenchao Chen,^{a,b} Pengqi Chen^{a,b}, Laima Luo^{a,b}, Junwu Liu^{a,b}

^a School of Materials Science and Engineering, Hefei University of Technology, Hefei
230009, China;

^b Engineering Research Center of Power Metallurgy of Anhui Province, Hefei
230009, China

Corresponding author: jgcheng63@sina.com (Jigui Cheng)

Abstract: Because of its excellent thermal properties, including a low thermal expansion coefficient and high thermal conductivity, diamond has great potential use in industry for application in heat sinks, packaging materials, and as a substrate in integrated circuits. When preparing diamond metal-matrix composites, it is usually necessary to coat the surface of the diamond particle with a metallic layer to improve the interfacial properties. In this study, diamond particles were surface-coated with tungsten using the microwave-heating salt-bath plating (MHSBP) method. The composition and morphology of the coatings were analyzed by X-ray diffraction, scanning electron microscopy, and energy dispersive spectroscopy. The results show that the coatings on the diamond surfaces become homogeneous and dense when the plating temperature is increased from 1050 °C to 1200 °C, and the diamond surfaces are fully coated when deposition is performed at 1200 °C for 20 min. There is a strong interfacial bond between the diamond particle and the tungsten coating. It is also found that the diamond particles maintain their original crystal morphology and there is a gradual change in tungsten content across the

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