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Protecting diamond abrasive from being corroded in the vitrified bond wheel manufactured by 3D printing

Jing Lu, Yanhui Wang and **Jianbing Zang**
Institute of Manufacturing Engineering, Huaqiao University, Xiamen, P.R. China

It is well known that, at elevated temperatures, diamonds are easily eroded by oxygen, oxygen compounds, molten KNO_3, and hydrogen, hence becoming easily degraded. Our experimental research shows that in high-temperature sintering of diamond/vitrified bond wheel prepared by 3D printing, oxidization of diamond grit occurs. This produces numerous pores in the matrix that weaken the retaining force of the grits and the bending strength of the composites. Coating the diamond surface with a barrier layer is practical in protecting the grit from degradation at high temperatures in oxidizing and corrosive environments. Cubic phase Si with high thermal stability was deposited on diamond girts and effectively protected the grits from being oxidized.

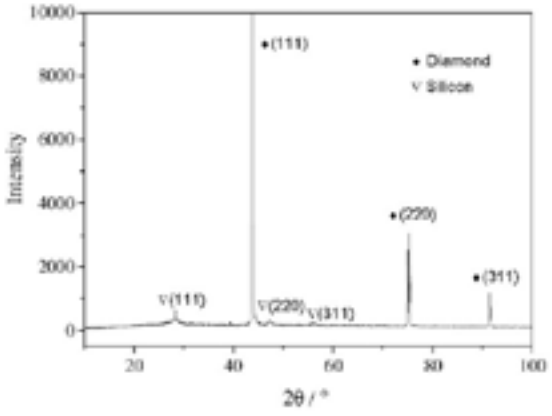

Figure1: *XRD pattern of Si-coated diamond grits.*

Biography

Jing Lu has completed her PhD in Material Science from Yanshan Universtiy, China. She is now a Professor at the Institute of Manufacturing Engineering, Huaqiao University. Her related achievements have been published in *Nano letters, Nanotechnology, Carbon* etc. She is keenly interested in the preparation of 3D printed vitrified bond diamond tools.

lujing26@hqu.edu.cn

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