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Thermal damage study on diamond tools at varying laser heating power and temperature by Raman spectroscopy

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Diamond tools are generally made of sintered polycrystalline diamond (PCD) on a hard metal tungsten carbide (WC-Co) substrate during the High Pressure High Temperature (HPHT) process. The diamond tools are used widely as cutting and drilling tools due to their unique combination of superior properties. However, there are several issues that need to be resolved about the diamond tools. At present it is known that diamond tools degrade with time as it is normally used at high temperatures, but what is not known is the damage mechanism and how the degradation varies as a function of temperature. In this study, we have made use of a laser based system to raise the temperature of the diamond tool and measure the diamond tool temperature. A study of the thermal damage on the diamond tool with respect to the laser heating power and temperature has been carried out using Raman spectroscopy; to determine the structure and composition of the resulting diamond tool. We have shown the radical changes on the diamond tool as the laser heating power and temperature increases.

Level (Hons, MSc, PhD, other)?

N/A

Consider for a student award (Yes / No)?

no

**Would you like to
 submit a short paper
 for the Conference
 Proceedings (Yes / No)?**

yes

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