

# Study on Improvement of Diamond Deposition on Al<sub>2</sub>O<sub>3</sub> Ceramic Substrates by a DC Arc Plasmatron

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We presented plasma processing using a DC Arc Plasmatron for diamond deposition on Al<sub>2</sub>O<sub>3</sub> ceramic substrates. Plasma surface treatments were conducted to improve deposition condition before processing for diamond deposition. The Al<sub>2</sub>O<sub>3</sub> ceramic substrates deposited, 5×15 mm<sup>2</sup>, were investigated by Scanning Electron Microscopy (SEM), Fourier Transform Infrared Spectroscopy (FTIR) and X-ray Diffraction (XRD). Properties of diamond (111), (220) and (311) peaks were shown in XRD. We identified nanocrystalline diamond films on substrates. The results showed that deposition rate was approximately 2.2 μm/h after plasma surface treatments. Comparing the above result with a common processing, deposition rate was improved. Also, the surface condition was improved more than a common processing for diamond deposition on Al<sub>2</sub>O<sub>3</sub> ceramic substrates.

**Keywords:** Plasmatron, Diamond Deposition, FTIR spectroscopy, X-ray diffraction, FE-SEM