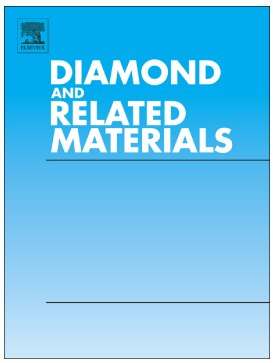

Limits of single crystal diamond surface mechanical polishing

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LIMITS OF SINGLE CRYSTAL DIAMOND SURFACE MECHANICAL POLISHING

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Abstract

We demonstrate the process of mechanical polishing of a single crystal diamond substrate to a roughness of no more than 0.5 nm. We used the anisotropy of the polishing intensity depending on the crystallographic orientation of the diamond substrate relative to the rotation direction of the cast iron grinding wheel (scaife). The surface distortions and its roughness were measured by atomic force microscopy (AFM) and X-ray reflectometry (XRR). The proposed technique optimization allows preparation of ultra smooth surfaces in a relatively short time of less than 10 minutes.

Keywords: single crystal diamond, mechanical polishing, surface roughness, X-ray reflectometry, atomic force microscopy.