

Tool influence functions of sapphire wheel polishing tools based on center supply polishing liquid

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Abstract: *The precise tool influence function (TIF) of the polishing tool is crucial for polishing path planning. Therefore, designing polishing tool to ensure the central single peak removal feature of the TIF is of great practical significance. Firstly, this study designed a polyurethane polishing wheel and studied its fixed-point and groove removal characteristics for polishing sapphire materials under different process parameters (rotational speed and compression offset) when external polishing fluid was supplied. Secondly, the material removal process of the polyurethane wheel and the shortcomings of the TIF characteristics were analyzed. A polyurethane wheel with a central supply of polishing fluid was proposed and fixed-point polishing was performed to verify its improvement in the TIF characteristics. Finally, further analysis and optimization were conducted, and an ultra-high molecular weight polyethylene polishing wheel based on central liquid supply was proposed. Fixed-point and groove polishing were performed to verify the stability of the ultra-high molecular weight polyethylene wheel in generating a central single peak removal function contour and the optimal process parameters.*
