

镶嵌固体润滑剂的自润滑刀具切削温度研究 Cutting Temperature of Cemented Carbides Base Self-lubricated Tool Embedded with Solid Lubricants

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关键词: 干切削 切削温度 自润滑刀具 摩擦磨损特性

摘要: 在刀具前刀面月牙洼磨损区域加工装填MoS<sub>2</sub>固体润滑剂的微孔, 制备了一种镶嵌固体润滑剂的自润滑刀具 (SLT-1), 并与前刀面有孔但无固体润滑剂的刀具 (SLT-2) 以及传统刀具 (SLT-3) 进行切削对比试验。用TH5104红外热像仪测试了3种刀具切削45号淬火钢的切削温度变化规律。结果表明: SLT-1自润滑刀具的切削温度明显降低, 比传统刀具SLT-3降低15%~20%, SLT-2刀具比SLT-3降低5%~10%。通过切削温度理论分析表明, 由于自润滑刀具SLT-1在前刀面形成润滑膜, 降低了前刀面剪切应力以及减少了刀屑接触面积, 使得切削温度显著降低。Microholes were made on the rake of the cemented carbide tools and MoS<sub>2</sub> solid lubricants were embedded into the microholes to form self-lubricated tools (SLT-1). Dry machining tests on hardened steel were carried out with the self-lubricated tool, the tool with microholes on the rake without solid lubricants (SLT-2) and the conventional tool (SLT-3). The variation of cutting temperature for 45# hardened steel cutting with the three cutting tools were tested by the TH5104 thermo tracer. The result shows that the cutting temperature of SLT-1 self-lubricated tool decreased obviously. It decreased 15%~20% than that of SLT-3. And the cutting temperature of SLT-2 decreased 5%~10% than that of SLT-3. Through the analysis of cutting temperature distribution, it was observed that the cutting temperature decreased and the raked face resistance was improved since self-lubricating film on the rake face decreased the shear stress and the contact length between chip and tool.

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