高速车削铁基高温合金硬质合金刀具磨损机理 Wear Mechanism of Cemented Carbide Tool in High Speed Machining Iron-based Superalloy GH2132

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摘 要： 使用4种硬质合金涂层和非涂层刀具材料进行铁基高温合金GH2132的高速干车削试验，采用电子扫描显微镜（SEM）观察刀具的磨损形貌，通过能谱分析（EDS）分析磨损表面的元素分布，并对刀具的主要磨损机理进行分析。研究结果表明，使用硬质合金刀具材料高速干车削铁基高温合金GH2132时，刀具的磨损机理主要为粘结磨损、扩散磨损、氧化磨损并伴有少量的微崩刃。高速切削时刀具的前刀面磨损形态不同于常速切削时的磨损形态，即磨损不表现为月牙洼的形式，而是表现为切削刃处磨损最大的斜面磨损形式，前刀面磨损区域随切削速度提高而减小，但磨损深度增大。 Four kinds of cemented carbide tools were used to turn Iron-based superalloy GH2132 at high-speed under dry cutting condition. Wear morphology of cutting tool was observed by SEM, and element distribution of tool surface was analyzed by EDS. Adhesive wear, oxidation wear and diffusion with micro-chipping were the main wear mechanisms of the cemented carbide tool .The rake face wear of the cutting tools in high speed machining was different from that in conventional speed machining. Namely, the rake face was not characterized by crater wear but by slope-plane-wear with the maximum wear at the cutting edge. Furthermore, the worn area of the rake face decreased with cutting speed and the wear depth increased correspondingly.

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