

机械工程

ZrO₂含量对WC基复合材料的力学性能和微观结构的影响

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摘要:

摘要: 以提高WC基复合陶瓷的断裂韧性和硬度为目标,利用ZrO₂作为材料粘结剂和增强相,同时引入Al₂O₃添加相,采用热压烧结工艺成功制备了WC-ZrO₂-Al₂O₃(WZA)复合刀具材料.在此基础上,添加一定量的VC作为晶粒生长抑制剂和助烧剂,以实现材料最大程度的致密化.并对热压后复合材料的硬度、抗弯强度和断裂韧性进行了测试和分析.探讨了ZrO₂含量对材料微观结构和力学性能的影响,研究了复合材料断面断裂方式和材料相的组成.

关键词: 关键词: 复合材料; 力学性能; 微观结构; WC

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Abstract:

Abstract: Aimed at improving the fracture toughness and hardness of WC matrix composites, ZrO₂ and alumina particles

were incorporated into the composite and a new tool material WC ZrO₂ Al₂O₃ was prepared by hot press sintering. Also, a

certain amount of VC was added to the composite to suppress grain growth in order to achieve the greatest relative density. The

hardness, bending strength and fracture toughness of the composite were tested. Additionally, the influence of zirconia content

on mechanical properties and the microstructure of WC matrix ceramic materials were analyzed. The fracture mechanism and phase

composition were also investigated.

Keywords: Key words: composites; mechanical properties; microstructure; carbide tungsten

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