



论文摘要

中南大学学报(自然科学版)

ZHONGNAN DAXUE XUEBAO(ZIRAN KEXUE BAN)

Vol.33 No.6 Dec.2002

[PDF全文下载] [全文在线阅读]

文章编号: 1005-9792(2002)06-0597-03

热压多孔碳化硼的力学性能及其影响因素

王 零 森

(中南大学粉末冶金国家重点实验室, 湖南长沙 410083)

摘 要: 用热压法制得了中等密度的碳化硼陶瓷,并测定了其抗弯强度、抗压强度、弹性(弯曲)模量、泊松比,得出了其抗弯强度、弹性模量与孔隙度的关系,以及抗弯强度与温度的关系. 研究表明:所制的碳化硼陶瓷表观密度为 $2.1\sim 2.3\text{ g/cm}^3$,晶粒粒径为 $12\mu\text{m}$,室温时平均抗弯强度为 247.8 MPa ,抗压强度大于 1250.7 MPa ,泊松比为 0.16 ,表明材料的微观结构良好. 在测量温度范围内,碳化硼的强度随温度的变化不大.

关键字: 碳化硼;陶瓷;热压法;中子吸收材料

Mechanical properties and influence of hot-pressed porous boron carbide

WANG Ling-sen

(State Key Laboratory For Powder Metallurgy, Central South University, Changsha 410083, China)

Abstract: The mechanical properties are very important and related to nearly all the uses for boron carbide. But as many brittle ceramics, these properties are extremely sensitive to microstructure. Since the materials with the same structure can't be obtained by controlling the process of manufacture, the formulae and data about mechanical properties reported by literatures are quite different. In this paper the bending strength, the compressive strength, the elastic (bending) modulus and poisson ratio of hot-pressed porous boron carbide are measured and the relationship between bending strength and poisson ratio, elastic modulus and poisson ratio, bending strength and temperature are studied. The results show that when the density is $2.1\sim 2.3\text{ g/cm}^3$ and the diameter of grain size is $12\mu\text{m}$, the average bending strength at room temperature is 247.8 MPa , the pressure strength is 1250 MPa , the elastic modulus is 290.4 GPa , and the poisson ratio is 0.16 , which states the micro-structure of material is good. In the range of measurement temperature, the boron carbide's value is nearly not changed.

Key words: boron carbide; ceramics; hot-pressed method; neutron absorber materials

版权所有：《中南大学学报(自然科学版、英文版)》编辑部

地 址：湖南省长沙市中南大学 邮 编： 410083

电 话： 0731-88879765 传 真： 0731-88877727

电子邮箱： zngdxb@mail.csu.edu.cn 湘ICP备09001153号