

### 论文摘要

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ZHONGGUO YOUSEJINSHUXUEBAO XUEBAO

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## Fe-Co-B-Si-Nb-Cr块体非晶合金在纳米压痕过程中的变形行为

张志纯<sup>1, 3</sup>, 龙志林<sup>1, 2, 4</sup>, 危洪清<sup>4</sup>, 彭建<sup>4</sup>, 许福<sup>4</sup>, 李乡安<sup>4</sup>

- (1. 湘潭大学 材料与光电物理学院, 湘潭 411105;
2. 湘潭大学 材料设计与制备技术湖南省重点实验室, 湘潭 411105;
3. 湘潭大学 能源工程学院, 湘潭 411100;
4. 湘潭大学 土木工程与力学学院, 湘潭 411105)

**摘要:** 利用纳米压痕技术研究直径为3 mm的 $\{[(\text{Fe}_{0.6}\text{Co}_{0.4})_{0.75}\text{B}_{0.2}\text{Si}_{0.05}]_{0.96}\text{Nb}_{0.04}\}_{96}\text{Cr}_4$ 块体非晶合金的变形行为以及加载速率对其塑性变形行为的影响规律。结果表明: 该块体非晶合金在低加载速率下表现出显著的锯齿流变, 而在高的加载速率下表现为连续的塑性变形; 在纳米压痕过程中, 该块体非晶合金出现室温蠕变现象, 且其硬度值随着加载速率的增大而减小。

**关键字:** 块体非晶合金; 纳米压痕; 锯齿流变; 蠕变

## Deformation behaviour of Fe-Co-B-Si-Nb-Cr bulk amorphous alloy during nanoindentation

ZHANG Zhi-chun<sup>1, 3</sup>, LONG Zhi-lin<sup>1, 2, 4</sup>, WEI Hong-qing<sup>4</sup>, PENG Jian<sup>4</sup>, XU Fu<sup>4</sup>, LI Xiang-an<sup>4</sup>

- (1. Faculty of Materials Optoelectronics and Physics, Xiangtan University, Xiangtan 411105, China;
2. Key Laboratory of Materials Design and Preparation Technology of Hunan Province, Xiangtan University, Xiangtan 411105, China;
3. College of Energy Engineering, Xiangtan University, Xiangtan 411100, China;
4. College of Civil Engineering and Mechanics, Xiangtan University, Xiangtan 411105, China)

**Abstract:** The deformation behaviour of  $\{[(\text{Fe}_{0.6}\text{Co}_{0.4})_{0.75}\text{B}_{0.2}\text{Si}_{0.05}]_{0.96}\text{Nb}_{0.04}\}_{96}\text{Cr}_4$  bulk amorphous alloy with a diameter of 3 mm and the influence of loading rate on its plastic deformation were investigated by the technique of nanoindentation. The results show that the  $\{[(\text{Fe}_{0.6}\text{Co}_{0.4})_{0.75}\text{B}_{0.2}\text{Si}_{0.05}]_{0.96}\text{Nb}_{0.04}\}_{96}\text{Cr}_4$  bulk amorphous alloy exhibits prominent serrated flow at low loading rate while the plastic deformation is continuous at high loading rate. During

nanoindentation, the room temperature creep of the  $\{[(\text{Fe}_{0.6}\text{Co}_{0.4})_{0.75}\text{B}_{0.2}\text{Si}_{0.05}]_{0.96}\text{Nb}_{0.04}\}_{96}\text{Cr}_4$  bulk amorphous alloy is observed, and its hardness decreases with the increase of loading rate.

**Key words:** bulk amorphous alloy; nanoindentation; serrated flow; creep

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地 址：湖南省长沙市岳麓山中南大学内 邮编： 410083

电 话： 0731-88876765, 88877197, 88830410 传真： 0731-88877197

电子邮箱： [f-ysxb@mail.csu.edu.cn](mailto:f-ysxb@mail.csu.edu.cn)