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大功率真空开关铜铬触头材料

洗爱平

(中国科学院 金属研究所, 沈阳材料科学国家(联合)实验室, 沈阳 110016)

摘要: 综述了大功率真空开关铜铬触头材料最近的进展。主要内容包括: 铜铬合金的发明及技术上的优点, 铜铬合金二元相图上的特点及常规铸造工艺上的困难; 铜铬合金的主要制备工艺包括粉末烧结法、粉末烧结熔渗法以及自耗电极法等, 铜铬合金中杂质的影响, 包括残余气体的影响、残余碳的影响及第三组元的影响等。对铜铬合金及其材料的显微组织对真空电触头的基本电性能(分断电流能力, 抗电弧烧蚀能力, 截断电流等)的影响进行了简要的概述, 最后对铜铬合金进一步发展方向(如铬粒子细化, 材料回收及准快速凝固工艺, 喷射成型等)进行了简要的讨论。

关键字: 铜合金; 触头材料; 制备工艺; 电性能

Cu-Cr contact materials for high power vacuum interrupters

XIAN Ai-ping

(Shenyang National Laboratory for Materials Science, Institute of Metal Research,
Chinese Academy of Sciences, Shenyang 110016, P.R.China)

Abstract: The recent development of Cu-Cr contact materials for high power vacuum interrupters is concluded. It includes the origination of Cu-Cr alloy and technical advantages; the characteristic of Cu-Cr binary diagram and the difficulties in convenient casting process; the main preparation processes of Cu-Cr alloy, such as powder sinter, sinter and vacuum infiltrate and arc melting process; the influence of impurities, such as residual gases, residual carbon and the third element in Cu-Cr alloy, on the properties of Cu-Cr alloy etc. Also, it summarizes the effect of Cu-Cr alloy and its microstructure on the basic electrical properties of the vacuum contactor (such as circuit interruption ability, resistance to erosion by arc, current chop etc.). Finally, the developing direction of the Cu-Cr contact materials in the future (Cr particle dispersion, alloy recycle and qui-fast solidification process, and spray forming etc.) are also discussed.

Key words: copper alloy; contact materials; process; electrical properties

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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-yxcb@mail.csu.edu.cn