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研究报告

动态再结晶特征及其对黄铜腐蚀敏感性的影响

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摘要: 研究了具有不同组织结构的铜合金管材在淡水中的腐蚀行为。合金存在大量粒径小于 $5\mu\text{m}$ 的晶粒,且大小晶粒差别显著,表现为不完全再结晶的组织结构。大量细小晶粒的存在增加了铜合金在淡水中的腐蚀敏感性,主要表现为表面膜层不稳定、膜层鼓泡脱落、出现微裂纹和沿晶腐蚀。不完全再结晶的组织可以形成腐蚀通道,使合金的腐蚀迅速向纵深发展。这种组织来源于热加工中的动态再结晶过程,因某种原因保留到了冷加工及其热处理过程之后。

关键词: 铜合金 腐蚀 动态再结晶 淡水

CHARACTERISTIC OF DYNAMIC RECRYSTALLIZATION AND ITS INFLUENCE ON CORROSION SENSITIVITY OF COPPER ALLOY

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Abstract: The corrosion behavior of copper alloy tube with different microstructures in fresh water was investigated in this paper. A lot of minute grains with less than $5\mu\text{m}$ diameter were discovered in the alloy matrix, indicating imperfect recrystallization. The existence of many micro-grains made local corrosion of copper alloy much more sensitive when servicing in fresh water, during which the film was unstable and peeled and micro cracking and intergranular corrosion appeared. Furthermore, this kind of microstructure with imperfect recrystallization could form corrosion channel and make the corrosion developing along grain boundary quickly. The microstructure was from dynamic recrystallization in hot deformation and remained in the material structure after cold working and heat treatment.

Keywords: copper alloy corrosion dynamic recrystallization fresh water

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