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Cu-Zn-Al形状记忆合金在模拟宫腔液中的腐蚀行为

陈邦义¹, 梁成浩^{1, 2}, 傅道军¹

(1. 大连理工大学 化工学院, 大连 116012;
2. 中国科学院 金属研究所金属腐蚀与防护国家重点实验室,
沈阳 110016)

摘要: 采用化学失重法、电化学方法和原子吸收光谱法研究了紫铜、Cu-Zn-Al形状记忆合金和Cu-Zn-Al合金在模拟宫腔液中的腐蚀行为。结果表明,模拟宫腔液中紫铜、Cu-Zn-Al形状记忆合金和Cu-Zn-Al合金的腐蚀历程受阴极氧去极化步骤控制。Cu-Zn-Al形状记忆合金和Cu-Zn-Al合金由于铝的表面离子化倾向比锌的大,优先形成致密坚固的保护性氧化铝膜,降低了腐蚀速率。在模拟宫腔液中发现Cu-Zn-Al形状记忆合金和Cu-Zn-Al合金发生脱铝腐蚀,Cl⁻参与腐蚀反应历程,促进脱铝腐蚀的进行。白蛋白与氧的竞争吸附加速了阳极溶解,使紫铜、Cu-Zn-Al形状记忆合金和Cu-Zn-Al合金的阳极活性电流密度随白蛋白浓度的上升而增加。

关键字: Cu-Zn-Al形状记忆合金; 模拟体液; 脱铝腐蚀

Corrosion behavior of Cu-Zn-Al shape memory alloy in simulated uterine fluid

CHEN Bang-yi¹, LIANG Cheng-hao^{1, 2}, FU Dao-jun¹

(1. School of Chemical Engineering, Dalian University of Technology, Dalian 116012, China;
2. State Key Laboratory for Corrosion and Protection,
Institute of Metal Research, The Chinese Academy of Sciences, Shenyang 110016, China)

Abstract: Chemical weight-loss method, electrochemical test technology and atomic adsorption spectrometry were used to investigate corrosion behaviors of copper, Cu-Zn-Al shape memory alloy(SMA) and Cu-Zn-Al alloy in simulated uterine fluid. The results show that corrosion process of copper, Cu-Zn-Al SMA and Cu-Zn-Al alloy in simulated uterine fluid is controlled by cathodic depolarization of oxygen. The corrosion rates of Cu-Zn-Al SMA and Cu-Zn-Al alloy are lower than that of copper result from ionization tendency of aluminum exceeding zinc, forming compact solidity protective alumina film. Dealuminification corrosion occurs in Cu-Zn-Al SMA and Cu-Zn-Al alloy. Cl⁻ takes part in the dealuminification corrosion process and accelerated this reaction. Competitive adsorption of albumin and oxygen accelerate anodic reaction, which lead anodic active currents of copper and Cu-Zn-Al SMA to rise with increasing albumin concentration.

Key words: Cu-Zn-Al shape memory alloy; artificial body fluid; dealuminification corrosion

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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:0731-8876765, 8877197, 8830410 传真:0731-8877197

电子邮箱: f-ysxb@mail.csu.edu.cn