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研究报告

热处理工艺对17-4PH钢耐海水腐蚀性能的影响

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摘要: 运用极化曲线、循环极化曲线等电化学方法研究了17-4PH钢经不同工艺热处理后的耐海水腐蚀性能,并对腐蚀形貌和显微组织进行了观察和分析。结果表明:该不锈钢经固溶+调整处理后,在520℃时效4 h时可获最佳的耐海水腐蚀性能,且综合力学性能优良。在一定的温度和时间区间内,随着时效温度的升高及时效时间的延长,马氏体板条呈逐步细化的趋势且晶间析出物逐渐增多。在不同温度及时间的时效处理过程中,富Cu沉淀相的析出、长大及逆转变奥氏体的产生是导致其耐蚀性产生差异的主要原因。

关键词: 热处理工艺 17-4PH钢 耐海水腐蚀性能 时效温度\铜析出相

EFFECT OF HEAT TREATMENT PROCESSES ON SEAWATER CORROSION RESISTANCE PROPERTY OF 17-4PH STEEL

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Abstract: The corrosion resistance property in artificial seawater of 17-4PH steel after different heat treatment processes was investigated by electrochemical tests, and the corrosion morphology and microstructure were also analyzed. The results indicated that after solution and intermediate treatments the steel showed the best corrosion resistance property and excellent mechanical properties while aging at 520℃ for 4 hours. The microstructure became finer and the precipitation in grain boundaries increased with the increase of aging temperature and time in a certain range. The reverted austenite and copper precipitates that separated out while aging treatment were the major determinants of the corrosion resistance property of 17-4PH steel.

Keywords: heat treatment processes 17-4PH steel seawater corrosion resistance property aging temperature copper precipitates

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参考文献:

[1] Li P, Cai Q Z, Wei B K, et al. Effect of aging temperature on erosion-corrosion behavior of 17-4PH stainless steels in dilute sulphuric acid slurry[J]. J. Iron Steel Res., Int.. 2006, 13(5):73-78

[2] Tsai W C. Improvement in the corrosive fatigue damage to the low-pressure steam turbine blades due to

- [3] Liu R L, Yan M F. Improvement of wear and corrosion resistances of 17-4PH stainless steel by plasma nitrocarburizing[J].Mater. Design, 2010, 31: 2355-2359 
- [4] Zhao Y, Wang F. Effect of modification parameters on microstructure and anticorrosivity of 0Cr17Ni4Cu4Nb Steel[J]. J.NorthEastern Univ, (Nat Sci), 2010, 31(7): 953-956
赵义,王福. 调整处理对0Cr17Ni4Cu4Nb钢组织及耐蚀性的影响[J]. 东北大学学报:(自然科学版), 2010, 31(7): 953-956)
- [5] Ma L, Yan Y G, LI X Y. Effect of Cl⁻ Concentration on corrosion resistance of CrCoMo stainless steel[J]. Corros. Sci.Prot. Technol., 2005, 17(3): 172-174.
- [6] (马力, 阎永贵, 李小亚.Cl⁻浓度对CrCoMo不锈钢耐蚀性能的影响[J]. 腐蚀科学与防护技术.2005, 17(3): 172-174)
- [7] Sergio S M T, Pardal J M, Joaquim S C. Failure induced by severe wear between studs and nuts of 17-4PH steel [J]. Eng. Failure Analysis, 2009, 16: 1765-1769 
- [8] Pistorius P C, Burstein G T. Metastable pitting corrosion of stainless steel and the transition to stability[J]. Philos.Trans. R. Soc. London, 1992, 341: 531-559 
- [9] Karaminezhaad M, Sharafi S, Dalili K. Effect of molybdenum on SCC of 17-4PH stainless steel under different aging conditions in chloride solutions [J]. J Mater. Sci., 2006, 41(11): 3329-3333 
- [10] Raja K S, Rao K P. Pitting behavior of type 17-4PH stainless steel weldments[J]. Corros. Sci., 1995, 51(8): 586-592 
- [11] Kochmanski P, Nowacki J. Influence of initial heat treatment of 17-4 PH stainless steel on gas nitriding kinetics[J]. Surf. Coat. Technol., 2008, 202: 4834-4838 
- [12] Xia X L, Li Y Q, Wu D M. Influence of different heat treatment processes on overaging microstructure and properties of 17-4PH steel[J]. Mater. Sci. Technol., 1997, (5): 106-110
- [13] Lin Y Z, Yang D J. Corrosion and corrosion control principle[M]. Beijing: China Petrification Publishing House, 2007:245

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1. 陈小明;宋仁国.7000系铝合金应力腐蚀开裂的研究进展[J]. 中国腐蚀与防护学报, 2010,22(2): 120-123
2. 魏世同 陆善平 何广忠 赵旭 李殿中 李依依.热处理工艺对含Nb焊缝金属组织与力学性能的影响[J]. 中国腐蚀与防护学报, 2009,45(9): 1063-1069