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Influence of pre-deformation and oxidation in high temperature water on corrosion resistance of type 304 stainless steel

Lv Jinlong[2], Luo Hongyun[1], Liang tongxiang[2]

1. Key Laboratory of Aerospace Materials and Performance (Ministry of Education), School of Materials Science and Engineering, Beijing University of Aeronautics and Astronautics, Xueyuan Road 37, Beijing, China, 100191

2. Beijing Key Laboratory of Fine Ceramics, Institute of Nuclear and New Energy Technology, Tsinghua University, Zhongguancun Street, Haidian District, Beijing 100084, PR China

Abstract: The passivation properties of deformed 304 stainless steels after immersion in borate buffer solution containing 0.2821 mol/L Cl^- at 288 °C were investigated. The spinel and magnetite oxides were formed on all the samples. However, the hematite oxides reduced significantly with the increasing of strain. The sample with maximum strain possessed the poorest corrosion resistance. The hematite oxide could offer high corrosion resistance, while magnetite evidently deteriorated corrosion resistance. Moreover, the influence of the donors in outer layer of oxide film on corrosion resistance was more important than that of the acceptors in inner layer.

Keywords: Stainless steel; EIS; Raman spectroscopy; High temperature corrosion; Oxide films;

*Corresponding author.Tel.: +86 10 89792737;fax: +86 10 69771464

e-mail addresses: ljltsinghua@126.com