Corrosion of Copper in a Concentrated LiNO_3 Solution at a High Temperature

Chunhuan Luo¹, Qingquan Su^{2,*}, Na Li¹, Yiqun Li¹

¹ School of Energy and Environmental Engineering, University of Science and Technology Beijing, 30 Xueyuan Road, Haidian District, Beijing 100083, China

² Beijing Engineering Research Center for Energy Saving and Environmental Protection, University of Science and Technology Beijing, 30 Xueyuan Road, Haidian District, Beijing 100083, China

*E-mail: suqingquan@ustb.edu.cn

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This paper presents the effects of the concentration, temperature, pH and Li_2CrO_4 on copper corrosion in a concentrated LiNO_3 solution. The LiNO_3 concentration had opposite effects on the copper corrosion. The corrosion rate increased with increasing temperatures, but decreased with increasing pH levels. Below 220 °C, Li_2CrO_4 promoted the formation of a thin and compact passive film comprising CuO , Cu_2O and Cr_2O_3 , which effectively inhibited the copper corrosion. Regarding corrosivity, the maximum applicable temperature for an absorption heat pump was extended from 165 °C to 220 °C using a LiNO_3 solution instead of a LiBr solution as the working fluid.

Keywords: Copper; Working fluid; High Temperature Corrosion; Inhibitor; Weight Loss

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