Corrosion of Copper in a Concentrated LiNO₃ Solution at a High Temperature

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This paper presents the effects of the concentration, temperature, pH and Li₂CrO₄ on copper corrosion in a concentrated LiNO₃ solution. The LiNO₃ concentration had opposite effects on the copper corrosion. The corrosion rate increased with increasing temperatures, but decreased with increasing pH levels. Below 220 °C, Li₂CrO₄ promoted the formation of a thin and compact passive film comprising CuO, Cu₂O and Cr₂O₃, 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 LiNO₃ solution instead of a LiBr solution as the working fluid.

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

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