Corrosion Behaviour of 1018 Carbon Steel in LiBr-H₂O-CaCl₂-LiNO₃ Mixtures

A.K. Larios-Galvez¹, R. Guardian-Tapia¹, R. Lopez-Sesenes², J.G. Gonzalez-Rodriguez^{1*},

¹ Universidad Autonoma del Estado de Morelos, Centro de Investigación en Ingeniería y Ciencias Aplicadas, Av.Universidad 1001, 62209-Cuernavaca, Morelos, Mexico

² Universidad Autonoma del Estado de Morelos, Facultad de Ciencias Químicas e Ingeniería, Av.Universidad 1001, 62209-Cuernavaca, Morelos, Mexico

*E-mail: ggonzalez@uaem.mx

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A study on the effect of CaCl₂, LiNO₃ and CaCl₂+LiNO₃ to the LiBr-H₂O system on the corrosion behaviour of 1018 carbon steel was performed with the aid of electrochemical techniques such as potentiodynamic polarization curves and electrochemical impedance spectroscopy. This system is used in conventional refrigeration absorption systems. LiBr was used at different concentrations (283.3, 425 and 825 g/L) and temperatures (25, 50 and 80°C). Corrosion current density value, I_{corr} , obtained in the LiBr+H₂O system decreased with the addition of these additives, obtaining the lowest value when CaCl₂ was added. I_{corr} values increased with both an increase in the testing temperature and the LiBr concentration. In addition to this, corrosion process for the LiBr-H₂O system was under desorption/desorption control, whereas in presence of these additives it was either under charge transfer or reactants diffusion control depending upon the testing temperature or LiBr concentration.

Keywords: Absorption systems; corrosion; carbon steel.

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