



## Corrosion Studies of 70Cu-30Zn and 70Cu-25Zn-5Sn Brass Alloys in NaCl+Na<sub>2</sub>S Media

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### Abstract

Despite numerous researches studying the effect of tin element (Sn) on the improvement of dezincification resistance of brass alloys, the influence of sulphide ions on corrosion behaviour of tin containing brasses was less reported. This research is devoted to investigate the corrosion behavior of 70Cu-30Zn and 70Cu-25Zn-5Sn alloys during six days of exposure to NaCl based solution containing 0, 100 and 800 ppm Na<sub>2</sub>S. Electrochemical impedance spectroscopy (EIS) and open circuit potential (OCP) tests were performed during the long term exposure time. Furthermore, thermodynamic predictions on probable reactions were carried out by employing multi-component Pourbaix (E-pH) diagrams. The EIS results declared that the polarization resistance of 70Cu-30Zn brass alloy decreased drastically from 10 to 0.2 kΩ.cm<sup>2</sup> while in 70Cu-25Zn-5Sn alloy it increased from 0.7 to 10 kΩ.cm<sup>2</sup>. Improvement in corrosion resistance has been related to the presence of tin-rich phases in alloy matrix confirmed by multi-component Pourbaix diagrams.

**Keywords:** EIS, Na<sub>2</sub>S, brass, tin, multi-component Pourbaix diagram

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