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Influence of Temperature and Potential on the Electrochemical Dissolution of Galena in HNO_3 at pH 2.0

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We investigated the influence of temperature and add potential on the electrochemical dissolution of galena in HNO_3 at pH 2.0. Potentiodynamic curves showed galena different electrochemical reaction states. From OCP to 160 mV (vs. saturated calomel electrode) galena was passivated with S^0, 160-320 mV was active dissolution, S^0 transformed into $S_2O_3^{2-}$, and potential above 320 mV was double-inductive area, $S_2O_3^{2-}$ transformed into SO_4^{2-}. High temperature accelerates galena electrochemical dissolution, when temperature increases from 25 °C to 40 °C, and then to 55 °C, the promotion efficiency is 233.33% and 322.22%, respectively. Electrochemical impedance spectroscopy (EIS) results are well in agreement with the three potential regions, and reveal the cause that high temperature accelerates galena electrochemical due to decreases charge transform resistance and passive resistance at passive potential area. These experimental results will give experimental basis for galena weathering explains and hydrometallurgy applied.

Keywords: galena; electrochemical; temperature; potential; potentiodynamic curve; EIS

FULL TEXT