The effect of some synthetic organic compounds on the oxidative dissolution of iron monosulfide (FeS)

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The effect of newly synthesized three organic compounds (OCs) on the oxidative dissolution of iron monosulfide (FeS) in air saturated HCl solutions, at 25°C and pH 1.3, was tested by potetiodynamic polarization (PP) and Electrochemical Impedance Spectroscopy (EIS). The investigated OCs were: *N*, *N*-diethyldithiocarbamate 1 - (3,5-dibromo-2-hydroxyphenyl)-1-oxoetan-2-yl (Pr 04), *N*, *N*-diethyldithiocarbamate 1 - (2-hydroxy-3,5-diiodophenyl)-1-oxoetan-2-yl (Pr 05) and O-ethyl xanthate 1 - (5-bromo-2-hydroxy-3-methylphenyl)-1-oxoetan-2-yl (Pr 06).

When FeS electrodes were pretreated with 1 mM ethanolic solutions of OCs the reordered oxidation potentials (open circuit potentials) are: -283.6 mV (Pr 04), -264.9 mV (Pr 05) and -259.2 mV (Pr 06). In the absence of the pretreatments, the oxidation potential is -305.5 mV.

The inhibition eficiency (IE) was computed with the following equation:

 $IE = (1 - i_{ox}/i_{ox}^{0}) \cdot 100$

 i_{ox} is the oxidation curent density in the presence of OCs and i_{ox}^{0} is the oxidation curent density in the absence of OCs.

The obtained inhibition eficiencies were: 44% (Pr06), 26% (Pr05) and 0% (Pr04), value which indicates that Pr04 is not an inhibitor of FeS oxidative dissolution.

In addition to PP and EIS investigations of FeS oxidation, the initial and pretreated FeS samples were analysed by FTIR spectrosopy. The obtained results are in agreement with the electrochemical data.

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