Corrosion Inhibition of 13Cr Stainless Steel in HCl/HAc/HF Acid Solution

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The corrosion and inhibition of 13Cr stainless steel in conventional HCl/HAc/HF acid solution were investigated by electrochemical measurements and soaking experiments. Results manifested that the HAc/HF acid solution as a low-corrosion acid can replace the conventional HCl/HF acid in oil well acidification construction process. EIS studies indicated that the mixed inhibitor formed by regular inhibitor and oxalic acid can effectively inhibit the corrosion reaction by forming an adsorption layer function as a barrier. Polarization curves indicated that the mixed inhibitor can reduce anodic dissolution and cathodic hydrogen evolution reactions simultaneously. In addition, the corrosion morphology of the corrosion product was examined by scanning electron microscopy. The results of the study can provide a theoretical basis for the search of low-corrosive acid to replace the conventional acid in oil well acidification construction process.

Keywords: 13Cr stainless steel, HCl/HAc/HF acid, corrosion inhibitor, oxalic acid, weight loss method, electrochemical measurement

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