A Ternary Inhibitor for X80 Steel Corrosion in Phosphoric Acid Solution

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A ternary corrosion inhibitor (C₁₄H₇NaO₇S-Mo-Ce) was prepared with alizarin red, sodium molybdate and cerium nitrate, its corrosion inhibition performance for X80 steel in phosphoric acid solution was investigated by chemical and electrochemical methods. Results showed that the inhibitor made up by 1.0g/L alizarin red, 1.0g/L cerium nitrate and 1.0g/L sodium molybdate produced strong synergistic effect, and the inhibition efficiency can reach 99.65%. SEM test showed that the ternary inhibitor formed a compact and complete membrane and effectively prevented the corrosive ions to contact with steel surface. The polarization curve showed that the ternary inhibitor is an anodic corrosion inhibitor. The excellent anti-corrosion efficiency of this ternary inhibitor is attributed to generate binary system of two different substances and successively adsorb on steel surface to produce synergic film.

Keywords: ternary corrosion inhibitor, alizarin red, phosphoric acid, X80 steel, synergy

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