

# KINETICS AND THERMODYNAMICS OF CORROSION INHIBITION OF CARBON STEEL, MILD STEEL AND SABIC IRON BY SYNTHESIZED N-DODECYL ARGININE SURFACTANT IN ACIDIC ENVIRONMENT: A COMPARATIVE STUDY

**Ahmed Fawzy<sup>1, 2</sup>, Ishaq A Zaafarany<sup>1</sup> and Hazim M Ali<sup>2, 3</sup>**

<sup>1</sup>Umm Al-Qura University, Saudi Arabia

<sup>2</sup>Assiut University, Egypt

<sup>3</sup>Aljouf University, Saudi Arabia

**T**he kinetics and thermodynamic studies of the corrosion inhibition of carbon steel, mild steel and SABIC iron in hydrochloric acid medium by synthesized N-dodecyl arginine surfactant (DAS) as environmentally friendly corrosion inhibitor were carried out using both chemical and electrochemical techniques. It was found that the synthesized surfactant acts as a good corrosion inhibitor for the three investigated steel samples in the tested medium. The inhibition efficiency increased as the concentration of surfactant is increased in the medium but it was found to decrease with increasing concentration of the corrosive medium (HCl) and temperature. The high inhibitive action of the surfactant is discussed in view of adsorption of its molecules on the steel surfaces and forming protective films. Thermodynamic and kinetic parameters have been evaluated and discussed which support the mechanism of physical adsorption of the surfactant. The synthesized surfactant was found to act as a mixed inhibitor. The morphology of the surfaces of the investigated steel samples was shown by scanning electron microscopy (SEM) which supported the presence of good protective films onto the steel surfaces.

afsaad13@yahoo.com