

Corrosion Inhibition Performance of Waterborne Acrylic Copolymer Nanoparticles: Experimental and Theoretical Insights into Copolymer Composition

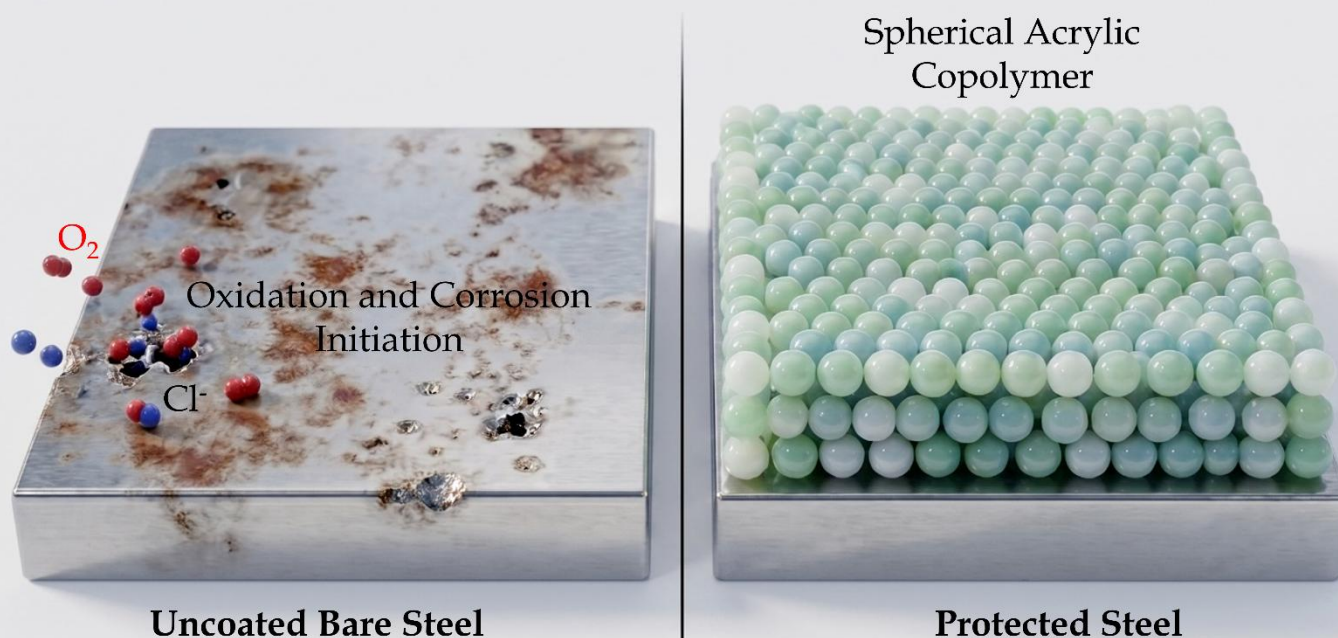
Mohammad Samiei, Golamali Farzi *, Zeinab Jarrahi

Department of Polymer Engineering, Faculty of Petroleum and Petrochemical Engineering, Hakim Sabzevari University, Sabzevar, Iran

Editor's note: The development of waterborne corrosion inhibitors has become a promising strategy to protect metallic materials from degradation in aggressive environments while minimizing the use of volatile organic solvents. This study by Samiei et al. investigates methyl methacrylate–butyl acrylate (MMA-co-BuA) copolymers as waterborne corrosion inhibitors for mild steel in 1 M HCl. Synthesized via miniemulsion polymerization, these copolymers show increased corrosion protection with higher MMA content, achieving an 82.7% inhibition efficiency at an 80:20 MMA:BuA ratio and 40 ppm. The reported enhanced performance is linked to improved polarity and interfacial interactions that strengthen the protective layer on the steel surface.

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