

Corrosion Inhibition Performance and Mechanism of Lignin Bio-based Corrosion Inhibitors

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Abstract Low-cost lignin, as the second abundant bio-mass, possesses many attractive advantages, like non-toxic, biodegradable, renewable, etc. The rich oxygen-containing groups of lignin, like -OH, -COOH and -CHO, provide a source for construction of dynamic bonds between lignin molecules and metal atoms. A series of lignin bio-based corrosion inhibitors were prepared based on grafting and copolymerization methods. Their corrosion inhibition performance for carbon steel in acidic and alkaline media were investigated using weight loss and electrochemical test. The *in-situ* SVET characterization was performed to monitor the change of corrosion inhibition ability with immersion time. Real-time AFM as well as many surface characterizations were carried out to illustrate the adsorption behavior and film-forming process of inhibitor molecules on metal surface. Adsorption phase-forming model was proposed to explain the superior corrosion inhibition performance of lignin bio-based corrosion inhibitors, which provided some novel insights for developing eco-friendly and broad-spectrum pH corrosion inhibitors from lignin-based biomass.

Keywords Corrosion; Corrosion inhibitor; Biomass; Lignin; Adsorption

Reference

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