Triblock Copolymer Pluronic F68 as a Corrosion Inhibitor for Aluminum-air Battery: An Electrochemical and in Silico Study

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In Al-air batteries, the self-corrosion of aluminum electrodes is an issue worthy of concern. In this paper, the inhibition performance and anti-corrosion mechanism of a triblock copolymer, namely, Pluronic F68, on Al in 3.5% NaCl electrolyte are investigated with a multidimension approach combining electrochemical and theoretical approaches. The results suggest that Pluronic F68 inhibitor can present wonderful anticorrosion efficiency, and the maximum inhibition efficiency can reach 94% at low dose concentration. Meanwhile, the battery containing Pluronic F68 exhibits better performance. Significantly, the present work is beneficial to understand the inhibition mechanism of similar organic polymers and provides a feasible approach to develop Al-air batteries.

Keywords: Al-air battery, Corrosion inhibition, Electrochemistry; Theoretical calculations

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