Design of novel Ce-MOF with synergistic inhibition for active corrosion protection of aluminum alloys

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Abstract BIPT-6, a new Ce-based metal-organic framework containing two types of corrosion inhibitors, was designed for complex corrosion protection of AA2024. Synthesized by a facile one-pot solvothermal method, BIPT-6 consists of Ce ions (III/IV) and 2,5-furandicarboxylate ligands. The space group of the novel BIPT-6 was identified as $P2_{1/n}$. Evaluated by EIS, BIPT-6 shows good corrosion inhibition efficiency for AA2024 in 0.05 mol/L NaCl ($5 \cdot 10^{-4}$ mol/L BIPT-6). Moreover, the corrosion inhibition mechanism of BIPT-6 was investigated. BIPT-6 as a novel MOF with synergetic combination of different types of inhibitors provides a promising approach for smart corrosion protection of aluminum alloys.

Keywords Metal organic frameworks; corrosion inhibitor; epoxy coating; AA2024 aluminum alloy; cerium