Research on the anti-corrosion performance of organosilane modified Basalt scales epoxy coating by EIS and SECM

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As the new type of natural material, Basalt scales (BS) exhibited flaky micron-sized structure. Due to the acid and alkali resistance and stable chemical properties, it was suitable to act as the filler for anti-corrosion coatings. However, BS showed unsatisfactory compatibility with epoxy resins, and its application was limited. This paper combined the basalt scales with the organosilane by covalent grafting, and prepared organosilane modified basalt scales. The modification of organosilane promoted the combination of basalt scales and epoxy resin and the stability of BS in the coatings by covalent bonds, simultaneously improved the anti-corrosion performance of the coatings. Electrochemical impedance spectroscopy (EIS) experiments showed that organosilane significantly improved the anti-corrosion performance of Basalt scales epoxy coatings, especially the organosilane containing amino groups. The promoting effect of organosilane on the stable dispersion of BS was evaluated by the barrier ability of the coatings to corrosive solutions, and the diffusion dynamics analysis implied the existence of the promoting effect. The enhancement of shielding anticorrosion was result of the optimized dispersion and stability of modified basalt scales.

Keywords: Basalt scales, Anti-corrosion, Shielding protection kinetics, Coatings

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