Synthesis of Rose-Like Sheet Zinc Phosphate by the Induction-Calcination Method and Its Application as a Corrosion Inhibitor in Coatings

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Rose-like sheet zinc phosphate (SZP) was prepared by the induction-calcination method using emulsified paraffin emulsion. The structure of SZP prepared under different conditions was characterized by X-ray photoelectron spectroscopy, X-ray diffractometer, Fourier transform infrared spectroscopy, and Scanning electron microscope. It was added as an anti-corrosive filler to waterborne epoxy-modified acrylic resin. The failure behavior of the coating film was studied by salt spray test and electrochemical workstation. Compared with pure resin, the best neutral salt spray resistance time increased from 24 hours to 336 hours, about 14 times. Besides, the contact angle of the film was measured with a contact angle meter. The results show that SZP can increase the contact angle of the film, improve the water-resistance of the epoxy-modified acrylic resin coating, and prolong the diffusion path of the corrosive medium to the substrate. Therefore, the rose-like sheet zinc phosphate enhances the barrier performance of the coating and can be used as an excellent corrosion inhibitor.

Keywords: Epoxy-modified acrylic resin, Sheet zinc phosphate, Nanomaterials, Coatings, Anti-corrosion

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