Preparation of zirconia-modified epoxy acrylate emulsion and its application in waterborne anticorrosion coating

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Zirconia-modified epoxy acrylate emulsion was synthesized via soap-free emulsion polymerization by adding different amounts of modified ZrO₂ nanoparticles. The modified ZrO₂ nanoparticles were characterized by Fourier transform infrared spectroscopy (FTIR), X-ray diffraction spectroscopy (XRD) and scanning electron microscopy (SEM). Thermogravimetric analysis (TGA) indicated that the addition of modified ZrO₂ could improve the thermal stability of the films formed by the emulsions. Moreover, the electrochemical impedance spectra (EIS) results showed that the film former of zirconia-modified epoxy acrylate emulsion could effectively improve the corrosion resistance of the coatings. The results showed that the emulsion containing 1% modified ZrO₂ had the best thermal stability and the corresponding coating had the best corrosion resistance.

Keywords: Epoxy coatings; Zirconia; Nanoparticles; Corrosion

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