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Porous epoxy microparticles prepared by an advanced aqueous method

Abstract

This paper reports the synthesis of emulsions of epoxy compounds with various ratios of epoxy, polyamide and calcium carbonate by homogenization in water at room temperature. The emulsion is cured at 80 °C, and during curing the small epoxy droplets in the emulsion coalesce. The cured coalesced epoxy droplets contain holes formed due to water trapped inside them and also due to the difference in curing rates between epoxy molecules on the outside versus inside of the coalesced droplets. The porous epoxy particles are obtained when the cured coalesced epoxy droplets are treated with hydrochloric acid to remove the calcium carbonate. The size of the porous epoxy particles and the number of holes formed depends on the curing rate of the epoxy compound.

Keywords — Aqueous methods, interlocking, microstructure, porosity, porous epoxy particles.