Properties of a Vinyl Ester Resin Modified with a Liquid Polymer

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Abstract: A vinyl ester (VE) resin was modified with different concentrations of a liquid polymer, polyoxypropylenetriamine (POPTA), in order to study the changes produced during curing and in its final properties. Fourier transform infrared spectroscopy (FTIR) measurements were made to obtain both the styrene and vinyl ester unsaturations conversions during the cure of the resin. The glass transition region was analysed by dynamic mechanical thermal analysis (DMTA), which showed the constancy of glass transition temperature with modifier content. The mechanical properties of the mixtures were also analysed and the results have been related to the flexural behaviour of the cured neat resin.

Key Words: Vinyl ester resins, liquid modifiers, cure schedule, ultimate properties

1. INTRODUCTION

Vinyl ester (VE) resins are produced from epoxy resins and unsaturated monocarboxylic acids. Their low room temperature viscosity coupled with rapid curing and relatively low cost make them suitable for various moulding processes [1, 2], such as the conventional unsaturated polyester resins. In addition, vinyl ester resins possess high mechanical strength as well as chemical and solvent resistance, which are not found in most of unsaturated polyester resins. Their hybrid molecular structure of epoxies and polyesters, allows them to challenge even epoxy resins in various application fields.

The viscosity of the resin is controlled by adjusting the molecular weight of the vinyl ester and the amount of styrene, which is a reactive diluent and serves as a crosslinking

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