

New Type of Bisphenol A-Free Vinyl Ester Resin

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Extended Abstract

Vinyl ester resins (VER) are high-performance unsaturated resins obtained by the addition reaction of various epoxy resins with α - β unsaturated carboxylic acids. VERs have remarkable corrosion resistance and improved physical properties over conventional unsaturated polyester resins, making VERs in a class of their own and a hallmark of today's resin industry [1]. Bisphenol A (BPA) is a precursor in the production of VER resins [2]. There is growing evidence that BPA can adversely affect humans [3,4]. Recent studies indicate that exposure to bisphenol A in adults may be associated with reduced ovarian response, miscarriage or premature birth, reduced sexual function in men, altered levels of sex hormones and thyroid, and cardiovascular disease [4]. The subject of the research is to obtain a VER resin free of bisphenol A. For this purpose, the modification of the end carboxyl groups in the chains of unsaturated polyesters with glycidyl methacrylate (GMA) was carried out [5]. GMA was introduced in the presence of a catalyst - quaternary phosphonium salt, which was added in two portions: at the beginning and in the middle of the process. In order to protect glycidyl methacrylate against polymerization, an inhibition system composed of: tert-butylhydroquinone: naphthoquinone was used. The course of the reaction was monitored by infrared spectroscopy. On the basis of the spectra, the disappearance of the bands originating from the epoxy groups was observed. After completion of the process, the obtained vinyl polyester was cross-linked with styrene. The obtained polymeric materials with different content of cross-linking monomer were tested for the assessment of mechanical and thermal properties as well as hardness and changes in gloss. The aim of the research was to check whether the obtained material has properties comparable to commercial vinyl ester resins based on bisphenol A.

References

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