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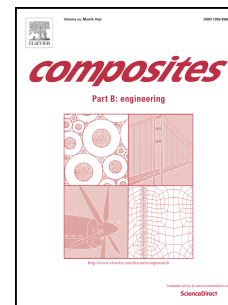
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UV-ACTIVATED FRONTAL POLYMERIZATION OF GLASS FIBRE REINFORCED EPOXY COMPOSITES

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ABSTRACT:

In this paper we report, for the very first time, the possibility to UV-crosslink a glass fibre reinforced epoxy composites. We have demonstrated that the crosslinking reaction proceeds via a radical induced cationic frontal polymerization (RICFP), where the UV-surface activation of cationic ring opening polymerization is able to promote the heat front that will activate a thermal initiator in the deeper layers. Because of the very high velocity of the reaction we could obtain quickly epoxy composites maintaining the good thermo-mechanical properties.

Keywords: Photopolymerization, UV-light, epoxy, Glass Fibre Reinforced Polymers (GFRPs) composites.

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1. Introduction

Epoxy resins are by far the most used material in composites, applied in different field varying from sport, automotive, marine and aviation industry [1-3]. Usually epoxy-glass fibre composites are produced by thermal polymerization in the presence of amine or anhydride as a hardener.

It is very well known that photo-induced polymerization can be used to activate epoxy curing in the presence of a suitable cationic photoinitiator [4-6], as an interesting alternative to thermal curing. The UV-activation is particularly attractive since the crosslinkable formulations are solvent free, the production rates are high and the energy required is much less than thermal curing [7]. Typically onium salts, either triarylsulfonium or diaryliodonium salts, are considered as photo-acid generator

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