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THERMAL OXIDATION OF VINYL ESTER AND UNSATURATED POLYESTER RESINS

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ABSTRACT

The thermal oxidative ageing of vinyl ester and unsaturated polyester was studied at temperatures ranging from 120 to 160°C and oxygen pressures ranging from 0.02 to 2.0 MPa. The oxidation of both materials was shown to generate anhydrides detected by FTIR spectroscopy, the origin of which being the oxidation of CH_2 group in α position of ester, and significant mass loss. According to FTIR study, vinyl ester was shown to be more oxidizable than unsaturated polyesters but this feature is counterbalanced by a lower volatile yield. The thickness of oxidized layer in diffusion limited oxidation regime was hence observed to be higher in Unsaturated Polyester (ca 600 µm) than in Vinyl Ester (ca 200 µm) at 160°C and seems not affected by the presence of high content of fillers.

KEYWORDS

Vinyl Ester, Unsaturated Polyester, Thermal Oxidation, Gravimetry, InfraRed spectroscopy, Diffusion Limited Oxidation