

Rubber Toughening of Epoxy Resin

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Abstract:

Nature of chemical interaction of epoxy cresol novolac resin (ECN) with carboxyl terminated polybutadiene (CTPB) during processing in presence of hardner e.g., diamino diphenyl methane (DDM) has been studied by Furier Transform Infrared Spectroscopy (FTIR). Scanning Electron Microscopy (SEM) has been used to study various stages of initiation and growth of the thermoset matrix as well as to investigate the morphology and distribution of rubber globules, from start of mixing to complete curing of the epoxy resin. Liquid blended samples, after mixing, were withdrawn at regular intervals of time. The recorded FTIR spectra showed variation of characteristic peak intensity, appearance of new peak due to esterification between oxirane group of epoxy and carboxyl group of CTPB and peak shift, which were correlated with the extent of reaction at 150 °C up to two hours. SEM provides visual information of the two phase morphology of the dispersed rubber particles and their state of aggregation. We have also conducted Atomic Force Microscopy (AFM) on the cross section of the cured specimen to obtain quantitative data and statistical information. The improvised technique using the capability of AFM provides, for the first time, a better insight into the mechanism of rubber toughening. We wish our readers to refer to our earlier publications for detailed information on materials, characterization procedure and physico-mechanical properties.

References :

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4. Ibid, J. Thermal Anal. Cal., 64, 521 (2001).
5. Ibid, J. Appl. Poly. Sci., 37, 861 (2003).

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To,

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Ref. : Your letter No. IIT/RTC/AKB/2003 dated 07.09.2003

Dear Prof. Bhowmick,

As advised, please find enclosed an advanced copy of the abstract “Rubber Toughening of Epoxy Resin” by D.K. Setua, Vineeta Nigam and G.N. Mathur for favour of presentation in the scientific session of “Rubber Processing” in PPS-20 as above.

Kindly acknowledge the receipt.

You shall also receive a post copy of the abstract through our office when the official formalities are completed.

Thanks for inviting our contribution for the meeting.

With kind regards and best wishes to you and your family for a VERY HAPPY NEW YEAR 2004.

Sincerely Yours,

**(Dr. D.K. Setua)
Scientist `F`
for Director**