

액정 에폭시의 열분해 반응 속도론
(Thermal degradation kinetics of liquid crystalline epoxy)

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Liquid crystalline epoxy(LCE) are now well established in basic research as well as in development for applications and commercial use. The thermal stability and degradation kinetics are essential information for the development of high heat-resistance polymers because the thermostability is a preliminary characteristic determining the melt-processing capability and applicability of the polymers especially at an elevated temperature.

Materials for liquid crystalline epoxy synthesis were obtained commercially and used. 4,4'-methylene dianiline(MDA) was used as a curing agent.

Differential scanning calorimeter(DSC) trace for the synthesized LCE from 30°C to 300°C at the heating rate of 10°C/min. Thermal gravimetry analysis(TGA) measurements were run at 5, 10, 20, 30 and 50 °C/min in both nitrogen and air at a flow rate of 50 mL/min with the sample size of 3-10 mg.

An epoxide group of LCE reacted with an amine group of MDA and formed a hydroxyl group which was acted as a catalyst on the cure reaction of other epoxide and amine groups.

The degradation mechanism in air is more complex because oxidation process is occurring in air. The activation energy of 88.67 and 36.65 kJ/mol for the thermal degradation of LCE/MDA in nitrogen and air, respectively.

1. J. Y. Lee, M. J. Shim and S. W. Kim, Polimery, 43, 685 (1998).
2. M. G. LU, M. J. SHIM and S. W. KIM, J. Appl. Polym. Sci., 75, 1514 (2000).