Effect of Fluorocarbon chain terminate group on phase separation behavior and mechanical property of polyetherimide modified epoxy resins

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Polyetherimides with phenyl end group (P-PIP) and fluorocarbon chain end group (F-PIP) were synthesized and blend with epoxy resins (DGEBA), the phase separation processes of these blends were characterized by SEM, DSC, TRLS and DMA. It was found that fluorocarbon chain led to reduce the rate of curing reaction and phase separation, and a higher conversion of epoxy resins. Both blends showed a similar morphology with PIP-rich irregular domains dispersing in an epoxy-rich continuous phase, which were very close to the co-continuous-type phase structure. However, the distance between PIP-rich domains decreased and the PIP-rich lines of the network intended to widen with the increase of the amount of F-PIP. The results of DMA showed that the modulus decay temperature and loss peak temperature increased with the amount of F-PIP. It implied that the introducing of fluorocarbon chain in PIP led to a further phase separation.

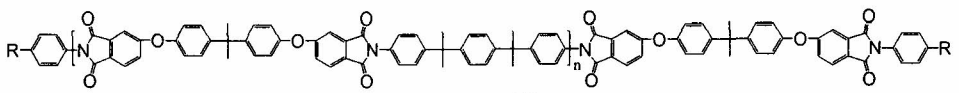

Figure 1. The structure of PIP.

Table 1. DMA results of blends cured at 180°C with different PIP composition

F-PIP : P-PIP	Modulus Decay Temperature T_{md} (°C)	Loss Peak Temperature T_{lp} (°C)
0 : 1	172	183
0.2 : 0.8	173	192
0.3 : 0.7	179	188
0.5 : 0.5	181	197
0.7 : 0.3	189	203
0.8 : 0.2	187	204
1 : 0	190	204

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