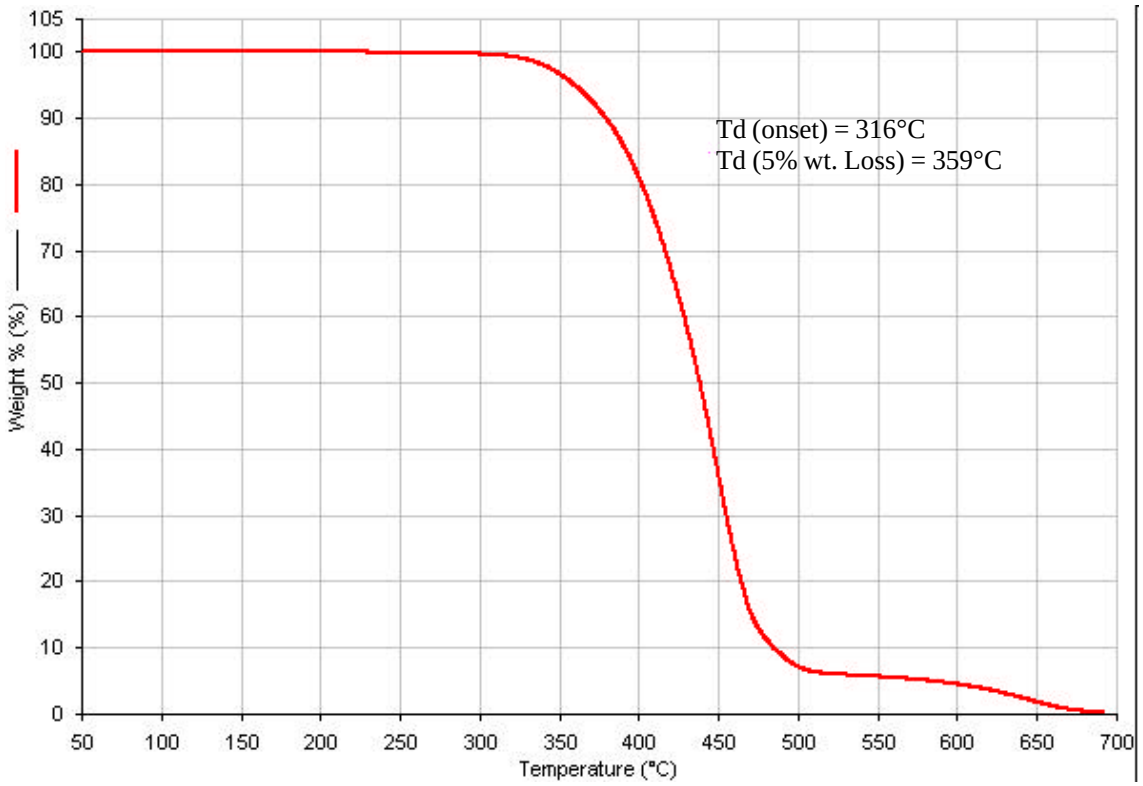

Figure 4.36 TGA for the Carbazole-Phenoxy Based Methacrylate Polymer

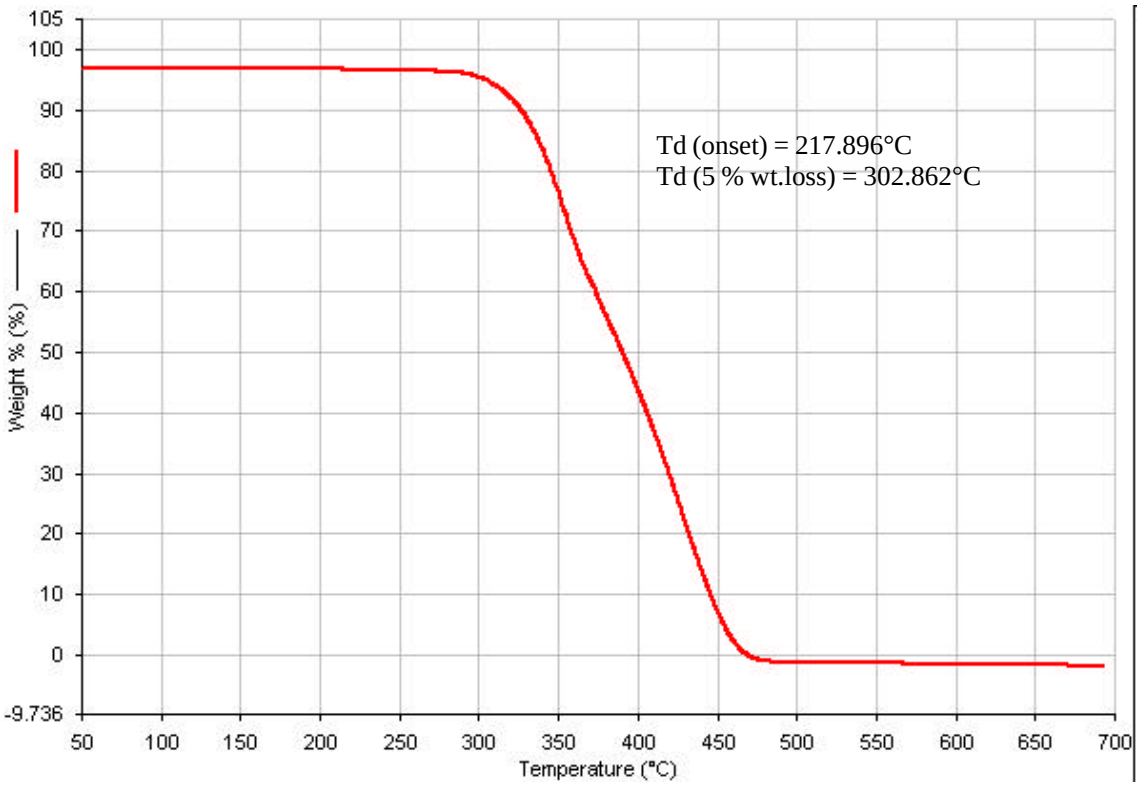

Figure 4.37 TGA for Poly(methyl methacrylate)

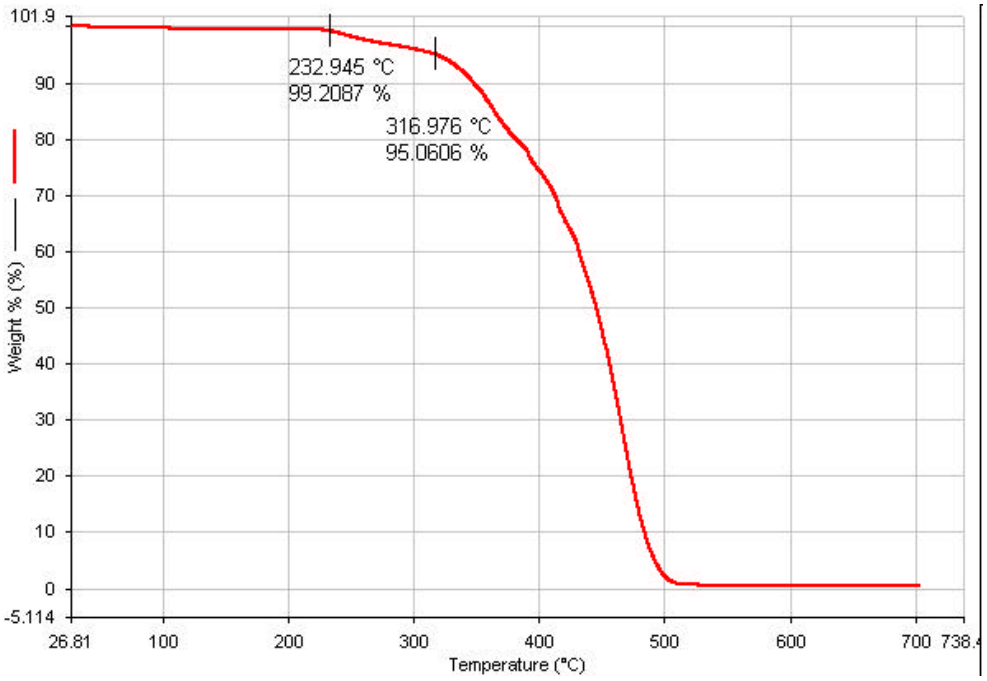

Figure 4.38 TGA for 25/75 Weight % PCPM/PMMA Copolymer

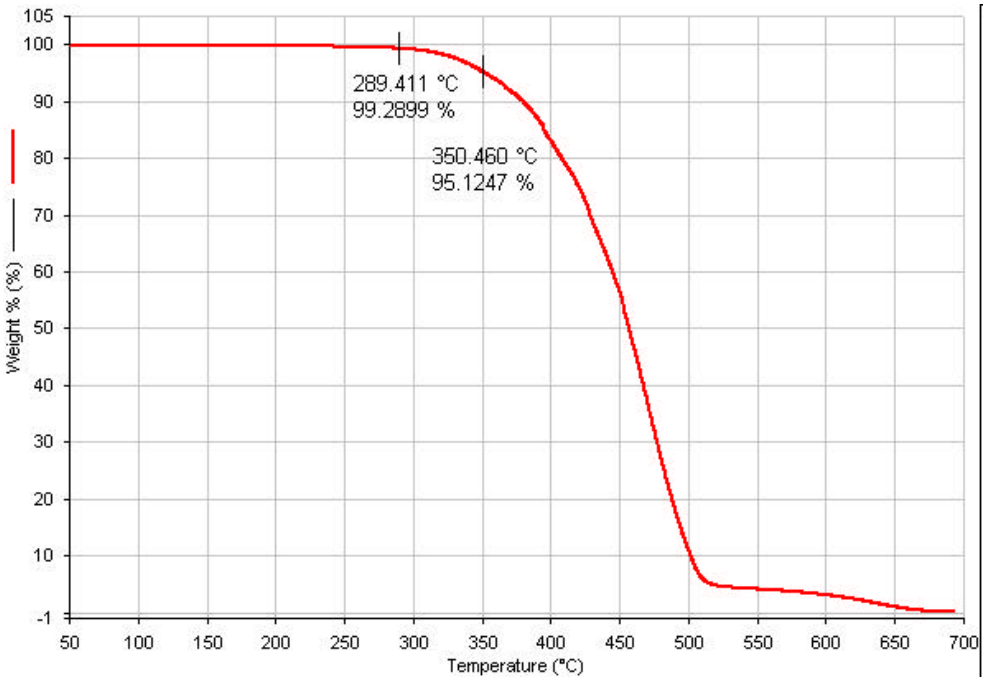

Figure 4.39 TGA for 50/50 Weight % PCPM/PMMA Copolymer

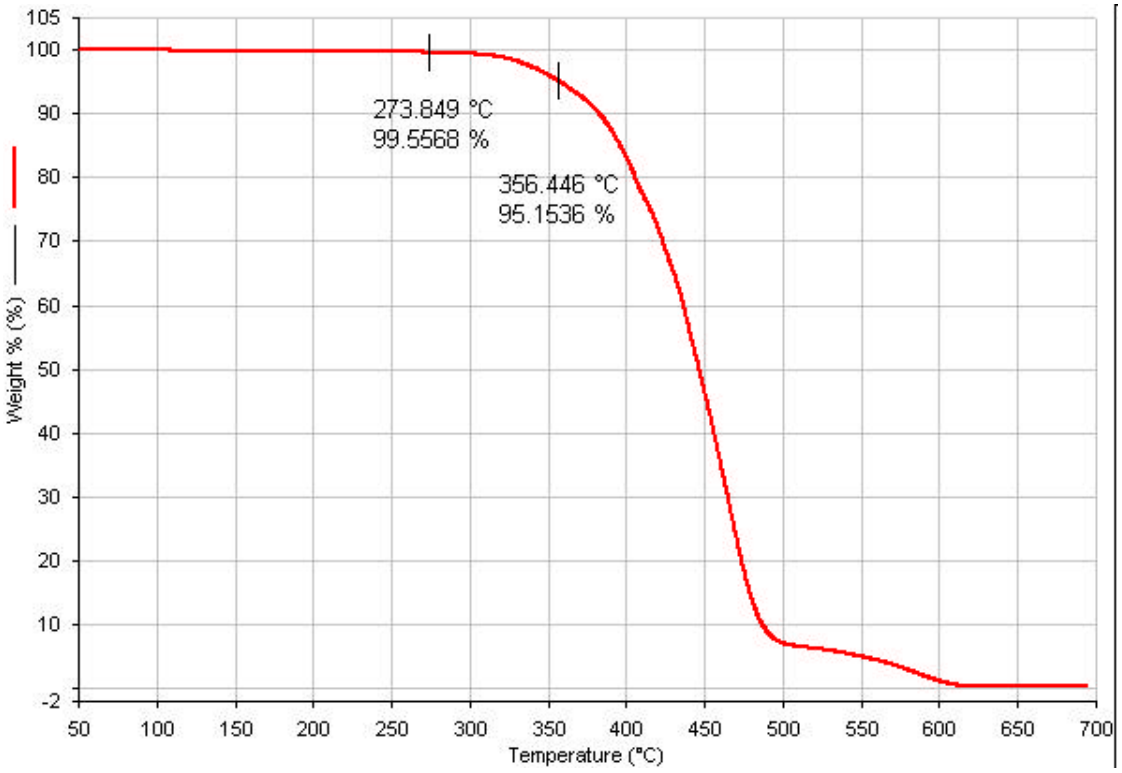

Figure 4.40 TGA for 75/25 Weight % PCPM/PMMA Copolymer

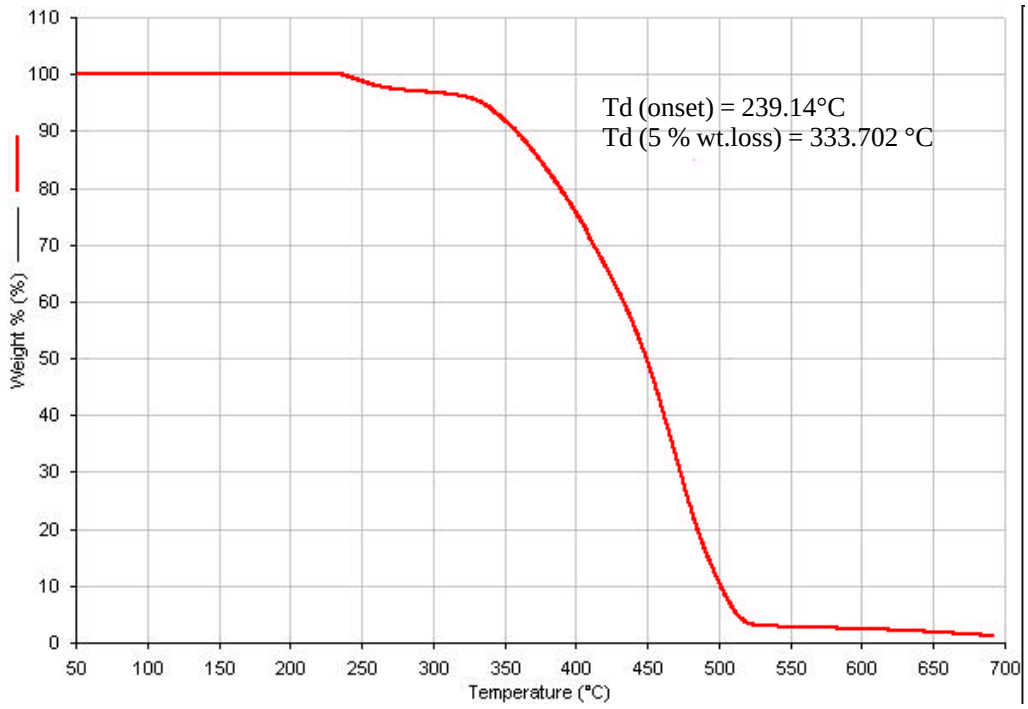

Figure 4.41 TGA for 25/75 Mole % PCPM/PMMA Copolymer

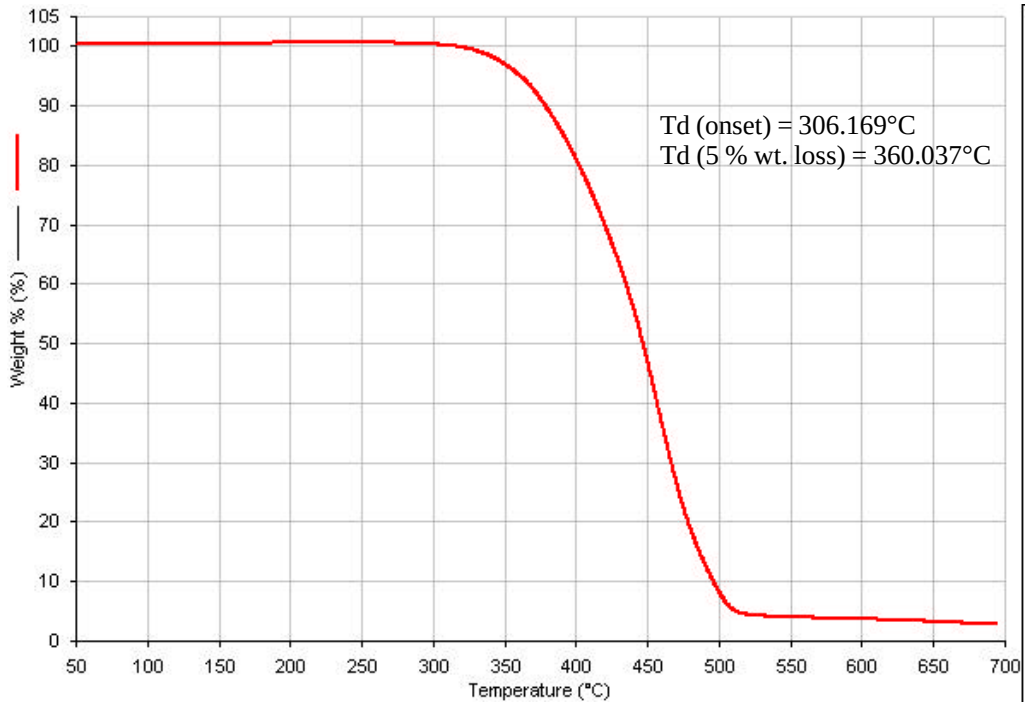

Figure 4.42 TGA for 50/50 Mole % PCPM/PMMA Copolymer

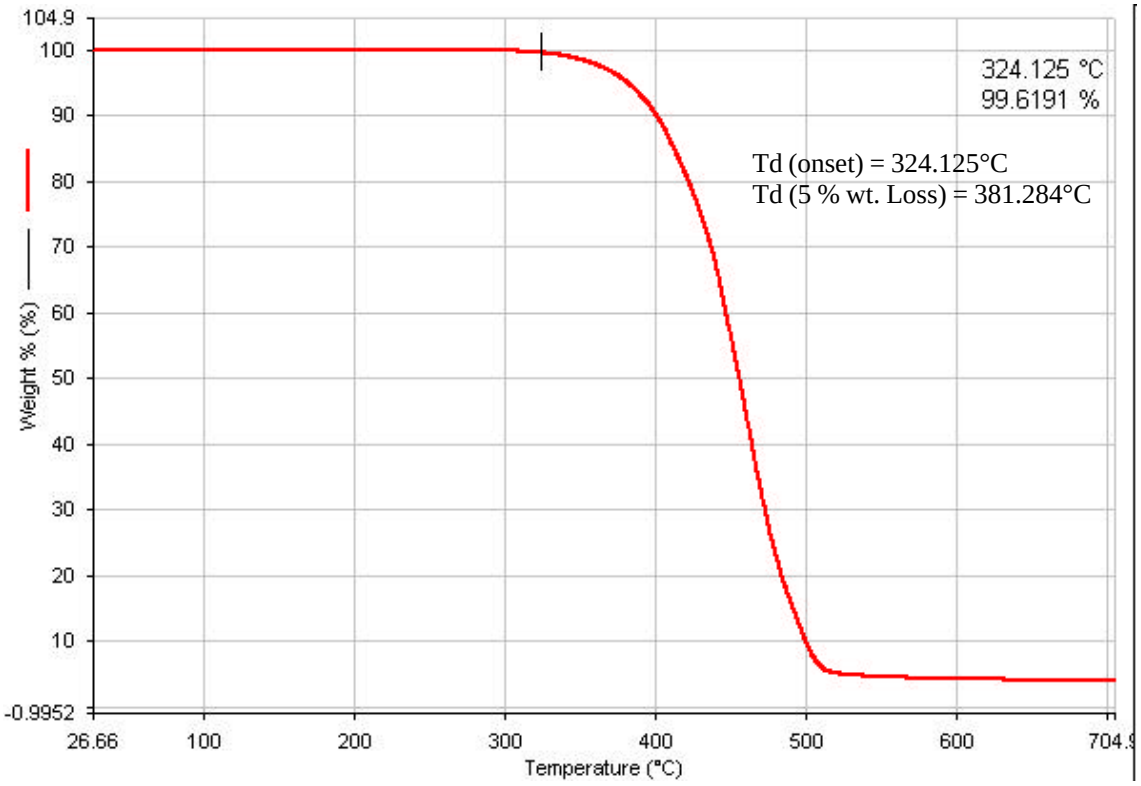

Figure 4.43 TGA for 75/25 Mole % PCPM/PMMA Copolymer

Both the weight percent and the mole percent copolymer series were analyzed. Table 4.7 displays the TGA results with respect to onset of degradation and with respect to 5 % weight loss. Copolymer degradation trends are shown graphically in Figures 4.44 and 4.45. The extra data points in the graphs compared to the table are because 50/50 weight percent PCPM/PMMA converts, for example, to 21/79 mole percent PCPM/PMMA. Likewise, 50/50 mole percent PCPM/PMMA converts to 79/21 weight percent PCPM/PMMA. The weight percent copolymer series, particularly with respect to onset of degradation, produced a more linear correlation between percent composition and decomposition temperatures than the mole percent copolymer series. Because of the large molecular weight difference between the two monomers, it was expected that weight to weight (or mass to mass) compositions would correlate more than mole to mole compositions for physical properties such as thermal degradation.

The onset of thermal degradation for the carbazole-phenoxy based methacrylate homopolymer was well above 300°C. The thermal stability of this polymer may prove very useful commercially, not only for processing and for optical applications, but also for applications such as electronics, where heat stability is a fundamental requirement.

Table 4.7 Thermal Decomposition Temperatures for the Carbazole-Phenoxy Based Methacrylate Polymer and Copolymers with Methyl Methacrylate

Composition	Thermal Degradation Temperatures			
	T_{onset} (°C)		$T_{5\ \%\ wt.\ loss}$ (°C)	
	Weight %	Mole %	Weight %	Mole %
100 % PMMA	218	218	303	303
25/75 PCPM/PMMA	233	239	317	334
50/50 PCPM/PMMA	289	306	350	360
75/25 PCPM/PMMA	274	324	356	381
100 % PCPM	316	316	359	359

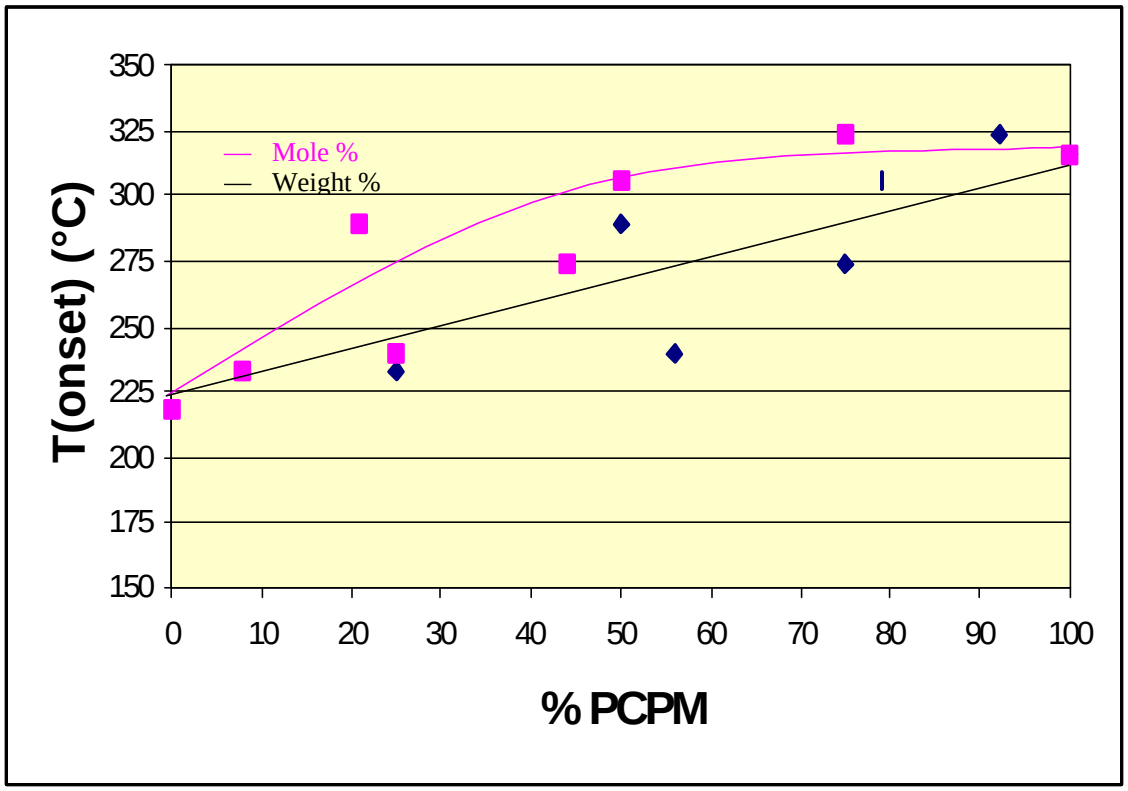

Figure 4.44 Graph of Onset of Decomposition Temperature Versus Percent Composition of PCPM/PMMA Polymers

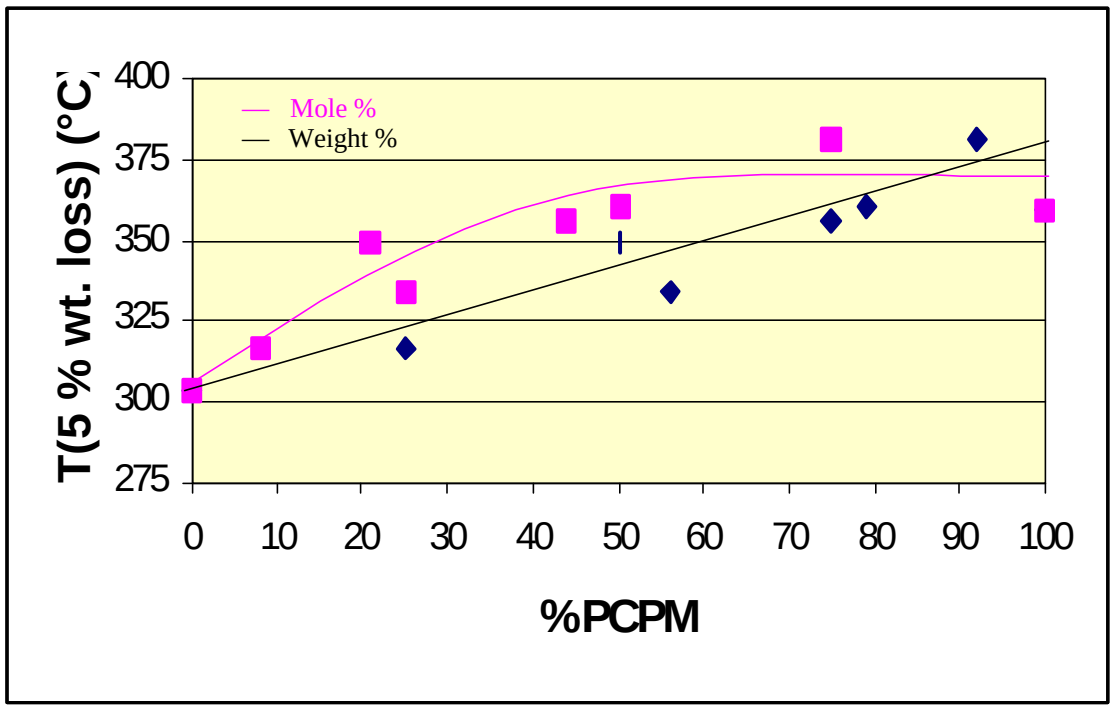

Figure 4.45 Graph of Decomposition Temperature at 5 % Weight Loss Versus Percent Composition of PCPM/PMMA Polymers