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**Phase morphologies and thermal stability in PC/PEEK blends***M.-C. Lu, R.-H. Chen, A.-C. Liou**Department of Mechanical Engineering, National Chiao Tung University, Hsinchu 30010, Taiwan,  
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The blending of polycarbonate (PC) with various polymers in polymer blends has been confirmed to alter the physical properties of the original material. However, few works have addressed heat resistance, thermal stability and the effect of interaction in PC/PEEK blends. The aim of this study is to determine the probability that PC can be blended with PEEK and to distinguish the phase morphology from the PC/PEEK blends by optical microscopy (OM) following some newly developed specific etching procedures. The results of etching indicated that PC2 was the minor phase, as irregular species or droplets were dispersed in the PEEK matrix of PC2/PEEK (20/80) and (40/60) blends. A co-continuous phase morphology was formed in PC2/PEEK (50/50) and (60/40) blends. PEEK formed variously sized droplets dispersed in the PC2 matrix of the PC2/PEEK (80/20) blend. DSC measurements reveal that the PC2/PEEK blends may be partially miscible, as indicated by the slight increase in both the  $T_g$  of PC2 and that of PEEK with PC2 content. However, some specific compositions, such as that of the PC2/PEEK (20/80) blend, were demonstrated to be miscible with a single value of  $T_g$ . This result was confirmed by enthalpy relaxation, which involved 24hr and 30hr annealing at 120°C. The results were also consistent with the OM images and the weight loss determined by TGA analysis. This work may result in innovative polymer blends and some applications on alloy of engineering plastics, indicating that an optimal processing temperature window may be between around 350°C and 390°C.