Optical property improvement of reactive BAPC/DAP blends with the aid of nano-silica coated titania

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In the past few years, the application of nano-titanium dioxide (nano-TiO2) on catalysis and ultraviolet (UV) shielding has attracted much attention. At the same time, the usage of nano-TiO2 as a UV absorber is limited in many practical areas because of the photocatalytic activity. In order to utilize nano-TiO2 as UV absorbers in a safe and effective manner, the silica coated nano-titanium dioxide (nano-TiO2@SiO2) was prepared by sol-gel process. The nano-TiO2@SiO2 was added into reactive bisphenol-A polycarbonate/diallyl phthalate (BAPC/DAP) blends and its effect on the reaction-induced phase separation and properties of the composites were investigated. The results showed that the nano-TiO2@SiO2 could affect the phase morphology of the BAPC/DAP/nano-TiO2@SiO2 composites by lowering the phase separation rate. The higher the content of nano-TiO2@SiO2, the more difficult of the phase separation proceeding in the composites, which would lead to a rougher fractured surface of the composite film, much higher UV absorption ability and the transmittance of visible light. Meanwhile, the composites with proper content nano-TiO2@SiO2 had highest glass transition temperature, i.e., 0.5 wt% compared with 0.1 wt% and 1 wt%.

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