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SELECTED PAPERS IN COMMEMORATE

一种新型聚对苯二甲酸丁二醇酯-层状硅酸盐纳米复合材料的制备与性能

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摘要 In this paper, poly(butylene-terephthalate)-layered silicate of clay nanocomposites (NPBT) are reported. Their thermal properties, heat distortion temperature (HDT) and crystallization nucleation are investigated. NPBT samples have apparent viscosity over 0.85, HDT of 30℃ to 50℃ higher than that of poly (butyleneterephthalate) (PBT) for clay load from 1.0% to 10.0% (by mass), and higher capability to accommodate clay than other polymers. The nonisothermal crystallization experiments indicate that the better thermal degradation behavior and crystallization rate of NPBT are 50% higher than PBT, and its injection mould processing temperature is lowered from 110℃ to 55℃. NPBT samples are characterized by several techniques. X-ray shows an original clay interlayer distance enlarged from 1.0 nm to 2.5 nm, while both TEM and AFM indicate an average size from 30nm to 100nm of exfoliated clay layers, and 3%(by mass) of particle agglomeration being phase separated from PBT matrix, which are factors on some mechanical properties decrease of NPBT. The disappearance of spherulitic morphology in NPBT resulted from layers nucleation is detected. Improving NPBT properties by treating clay with long chain organic reagent and controlling the way to load it is suggested.

关键词 poly(butylene-terephthalate)-layered silicate of clay nanocomposites crystallization nucleation thermal properties phase separation

分类号

Preparation and Properties of a New Type of Poly (butylene-terephthalate) with Layered Silicate Nanocomposites

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Abstract

In this paper, poly(butylene-terephthalate)-layered silicate of clay nanocomposites (NPBT) are reported. Their thermal properties, heat distortion temperature (HDT) and crystallization nucleation are investigated. NPBT samples have apparent viscosity over 0.85, HDT of 30℃ to 50℃ higher than that of poly (butyleneterephthalate) (PBT) for clay load from 1.0% to 10.0% (by mass), and higher capability to accommodate clay than other polymers. The nonisothermal crystallization experiments indicate that the better thermal degradation behavior and crystallization rate of NPBT are 50% higher than PBT, and its injection mould processing temperature is lowered from 110℃ to 55℃. NPBT samples are characterized by several techniques. X-ray shows an original clay interlayer distance enlarged from 1.0 nm to 2.5 nm, while both TEM and AFM indicate an average size from 30nm to 100nm of exfoliated clay layers, and 3%(by mass) of particle agglomeration being phase separated from PBT matrix, which are factors on some mechanical properties decrease of NPBT. The disappearance of spherulitic morphology in NPBT resulted from layers nucleation is detected. Improving NPBT properties by treating clay with long chain organic reagent and controlling the way to load it is suggested.

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