

Rheology of graphene/polymer composite melts

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Graphene/polycarbonate nanocomposites were fabricated by solution blending. We observed the contraction to the direction orthogonal to the shear direction during melt flow. The Peclet number in graphene/polycarbonate composites is estimated to be $10^5 \sim 10^8$, indicating the structural evolution of graphene sheets during shear flow may not be related with Brownian motion. The contraction results in the negative normal stress differences, which is due to the contraction of the composite induced by the deformation of gel-like structure during flow in melt. The linear viscoelasticity of graphene/polycarbonate composites was also characterized. The storage modulus approaches to a solid-like plateau in low frequency at concentration of graphene from 0.05 to 0.70 wt.%. The results presented here indicate that a small amount of graphene can be utilized as a flow modifier for PC in various applications such as polymer composites and a coating process.