Rheological Properties of Branched Polycarbonate with High-Intensity Ultrasound for Polymer Melt Mixing

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Power ultrasound is at 20-100 kHz where greater acoustic energy can be generated to induce cavitation in liquids. So, it is widely used in the areas of chemical synthesis, reaction and many processing. By combining high intensity ultrasound which causes chain scission of polymer molecules and a multifunctional agent (MFA) having double bonds at its ends, we were able to modify the molecular structure of polycarbonate (PC) from linear to a branched structure during melt processing. The three double bonds in chain ends of MFA were expected to act as sites for trapping macroradiclas of PC during the course of ultrasound-assisted mixing process. The transformation of molecular structure of PC was confirmed by the measurements of rheological properties of the modified PC. After the ultrasonic irradiation of PC together with MFA, increase in complex viscosities and shear-thinning behavior were observed.