Spectroscopic Analysis of Poly(bisphenol A carbonate) Using High Resolution ^{13}C and ^{1}H NMR

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Quantitative structural and end-group analysis of poly(bisphenol A) carbonate (BPA-PC) were performed and number average molecular weights (M_n) were determined using 125.76 MHz ^{13}C and 500.13 MHz ^{1}H nuclear magnetic resonance (NMR) spectroscopy. BPA-PC with wide range of end-group ratios (0.26-2.83) and number average molecular weights (1,500-9,000 g/mol) were synthesized using melt transesterification by changing initial monomer ratio and reaction scheme. Results of the NMR analysis for the melt polymerized samples were compared with those of a commercial BPA-PC with M_n of 16,000 g/mol. NMR spectroscopy is a very selective and accurate method not only in quantification of both phenolic chain end and phenyl chain end-groups but also in structural analysis of main chain groups. By paying proper attention to the conditions of NMR spectrum collection, extremely small amount of end-groups (~ 0.02 per repeating unit) could be analyzed. The molecular weights determined by NMR end-group quantification agreed well with the molecular weights measured by GPC.