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Katja Jankova[1], Anders E. Daugaard[1], Norbert Stribeck[2], Ahmad Zeinolebadi[2], Morteza Ganjaee Sari[2], Catalina-Gabriela Potarniche[3], Erik Appel Jensen[3], Jesper de Claville Christiansen[3], Søren Hvilsted[1]

Danish Polymer Centre, Department of Chemical and Biochemical Engineering, Technical University of Denmark, DK-2800 Kgs. Lyngby[1]; Institute for Technical and Macromolecular Chemistry, University of Hamburg, Bundesstr. 45, DE-20146 Hamburg [2]; Department of Mechanical and Manufacturing Engineering, Aalborg University, DK-9220 Aalborg[3]
kaj@kt.dtu.dk

With the aim of creating tough nanocomposits (NC) [1] based on polypropylene (PP) and nanoclay (NCl) in the framework of the 7th EU program NANOTOUGH we have designed amphiphilic block copolymers utilizing Atom Transfer Radical Polymerization (ATRP) [2]. They consist of a hydrophobic block of Kraton L-1203 from Kuraray Co., Japan with molecular weight 7000 and PDI=1.05, and a hydrophilic block of quaternized dimethylaminoethyl methacrylate (DMAEMA). The size of the hydrophilic block was varied, which increasingly caused better dispersibility of the block copolymer in water. This was essential for the exchange of the Na+ ions of the used NCl (3.8 wt.-% aq. dispersion of montmorillonite, MMT from Laviosa Chimica Mineralia, Italy) by the synthesized charged block copolymer, which was performed in water. Modified nanoclays with 2.5 to 8.0 wt.-% of the quaternized PEB-*b*-PDMAEMA$_{35}$ were prepared. The exfoliation and intercalation was studied by XRD. Rheological measurements of either aq. solutions of the charged block copolymers or PP master batches with various amounts of the modified MMT were performed. Tensile tests of NCs show similar behaivor, but SAXS reveals change in the nanostructure. According to the structural data derived from SAXS [4] the MMT acts like a nucleating agent to the PP that starts competitive nucleation of crystallites in the PP during manufacturing. Consequently, the PP crystallites in the composites are small and imperfect. This means that the self-reinforcement of the PP (by its crystallites) is replaced by alien-reinforcement (of the MMT). Furthermore, the results from the impact strength and cyclic test of the prepared PP nanocomposites [3] are promicing.

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