

SYNTHESIS AND THERMAL PROPERTIES OF NEW NANO-STAR SHAPED BLOCK COPOLYMERS

Hadi S Al-Lami

University of Basrah, Iraq

Over the recent few years, controlled "Living" radical polymerization (CRP) has undergone notable development and has become one of the most capable and vigorous synthetic methods in modern polymer chemistry. CRP is interesting from both scientific and industrial viewpoints, as the discovery of these reactions opened up a whole new world of possibilities regarding the design of novel polymeric architectures and compositions. Among the developed, controlled radical polymerization processes, one approach was the most successful. Control via a reversible redox reaction between alkyl halides and transition metal complexes, this process called atom transfer radical polymerization (ATRP). Herein, the work is demonstrating a synthesis of well-defined star-shaped block copolymers having eight arm poly (POSS lactide-b-N- hydroxyethyl acrylamide) inorganic/organic polymers prepared by atom-transfer radical polymerization with the increasing of N-hydroxyethyl acrylamides (HEA). Thus, we believe that increasing the number HEA polymer chains of arms will reflect positively on the thermal stabilities of the copolymers and to improve their different application efficiencies since they appear to have nanofiber structures. Their syntheses were confirmed by Fourier transform infrared spectroscopy (FTIR), nuclear magnetic resonance (¹H NMR and ¹³CNMR), and gel permeation chromatography (GPC). The characterization of the copolymers was verified the expected structure and composition with the presence of nanofibre structure as examined by scanning electron microscope, and it was found that their size decreased with increasing L-lactide monomer chain length. This was positively reflected on their thermal stabilities determined from TGA micrographs like decomposition temperature at 50% loss of the sample weight, decomposition rate, and the char content, etc.

hadisalman54@yahoo.com