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Synthesis of Polyester Networks through Ionic Interactions

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A supramolecular polymeric assembly originate from reversible, non-covalent interactions such as hydrogen bonding, ionic interactions, metal-ligand bond, π – π stacking between polymer chains or units on polymer chains. Supramolecular materials are sensitive to external stimuli in a different manner than traditional polymers due to their reversibility. This reversibility and low energy bonding brings extra features to material compared with covalent polymers and consequently enable materials to be reprocessed and recycled in the assistance of heat or solvent. Ionic hydrogen bonds, which are formed by a proton transfer between anions and cations are more robust and less-directional than traditional neutral hydrogen bonds. Hence, it would be beneficial to incorporate thermoreversible ionic hydrogen bonds as alternative cross-links into polymers to attain the reprocessing and recycling of crosslinked materials at elevated temperatures. Here in we report the facile synthesis of supramolecular ionic networks using a series of di- or multifunctional amines and carboxyl-terminated polyesters. A proton transfer reaction takes place between the carboxyl-terminated polyesters and the amine groups leads to the corresponding ionic carboxylate and quaternary ammonium groups. The influence of the density of ionic hydrogen bonds on the physical properties of polymers was studied. H-NMR and FTIR analyses were conducted to characterize obtained polymers. Thermal analysis was performed on DSC. Rheological measurements of the ionic networks were carried out using oscillatory tests and parallel plate geometry.

Biography:

Goknil Susler graduated from Yıldız Technical University with a bachelor's degree in chemistry in 2016 with her thesis on "Synthesis of triazine-based macromolecules and examination of their liquid crystal properties". She is a MSc. student in chemistry at Bogazici University. She is simultaneously works at Pulver Kimya San. ve Tic. A.S. in R&D Department as a part-time chemist. Her research areas are powder coating resins, melt polymerization.