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Polymer Recycling by Biomaterial and Its Application in Grease Formulation

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Abstract : There is growing interest in the development of new materials based on recycled polymers from plastic waste, and also in the field of lubricants much effort has been spent on substitution of petro-based raw materials by natural-based renewable ones. This is due to the facts of depleting fossil fuels and due to strict environmental laws. In relevance to this, new technique for the formulation of grease that combines the chemical recycling of poly (ethylene terephthalate) PET with the use of castor oil (CO) has been developed. Comparison to diols used in chemical recycling of PET, castor oil is renewable, easily available, environmentally friendly, economically cheaper and hence sustainability indeed. The process parameters like CO concentration and temperature were altered, and further, the influences of the process parameters have been studied in order to establish technically and commercially viable process. Further thereby formed depolymerized product find an application as base oil in the formulation of grease. A depolymerized product has been characterized by various chemical and instrumental methods, while formulated greases have been evaluated for its tribological properties. The grease formulated using this new environmentally friendly approach presents applicative properties similar, and in some cases superior, compared to those of a commercial grease obtained from non-renewable resources.

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