

## ENHANCING OF THERMAL STABILITY OF PE BY E-BEAM RADIATION

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Increased utilization of electron-beam (e-beam) for modification and enhancement of polymer properties has been well documented over the past forty years. Of specific interest to the plastic industry has been the use of e-beam processing (EBP) to improve thermal, chemical, barrier, impact, wear and other properties of inexpensive commodity thermoplastic, extending their utility to demanding applications typically dominated by higher-cost engineered materials. EBP of cross-linkable plastics has yielded materials with improved dimensional stability, reduced stress cracking, higher service temperature, reduced solvent and water permeability and significant improvements in other thermo-mechanical properties.

The aim of this work was enhancing the thermal stability of one of the most popular commercial polymer – polyethylene (PE) by E-beam irradiation in order to make it possible to use as a material for autoclave bags in autoclave sterilization techniques, which requires a thermal stability of the material till 120-140°C (standard for sterilization).

The films of three types of polyethylene (PE) resins - low density polyethylene (LDPE) resin, linear low density polyethylene (LLDPE) resin and high density (HDPE) resin, all supplied by Polyolefin Company (Singapore) Ptc.Lcd.,- prepared by compression molding and subjected to different dose (50, 100, 150 and 200 kGy) of e-beam radiation – have been used in this investigation. Results show that radiation has more effect on HDPE, which indicates crosslinking of crystalline part before amorphous phase, due to proximity of free radicals created along PE chain in the crystallites.