RADIATION STERILIZATION

Material	Radiation Stability	Comments
Polystyrene	Excellent	.
Polyethylene, various densities	Good/Excellent	High-density grades not as stable as medium – or low – density grades.
Polyamides (nylon)	Good	Nylons 10,11,12,6-6 are more stable than 6. Film and fiber are less resistant.
Polyimides	Excellent	
Polysulfone	Excellent	Natural material is yellow.
Polyphenylene sulfide	Excellent	
Polyvinyl chloride (PVC)	Good	Yellows. Antioxidants and stabilizers prevent yellowing. High-molecular-weight organoting stabilizers improve radiation stability; colour-corrected radiation formulations are available.
Polyvinyl chloride/Polyvinyl acetate	Good	Less resistant than PVC.
Polyvinylidene dichloride (Saran)	Good	Less resistant than PVC.
Styrene/acylonitrile (SAN)	Good/Excellent	
Polycarbonate	Good/Excellent	Yellows. Mechanical properties not greatly affected; color-corrected radiation formulations are available.
Polypropylene, natural Polypropylene, stabilized	Poor/Fair	Physical properties greatly reduced when irradiated. Radiation-stabilized grades, utilizing high molecular weights and copolymerized and alloyed with polyethylene, should be used in most radiation applications. High-dose-rate E-beam processing may reduce oxidative degradation.
Fluropolymers:		When irradiated, PTFE and PFA are significantly damaged. The others show better stability. Some are excellent.
Polytetrafluorethylene (PTFE)	Poor	
Perfluoro alkoxy (PFA)	Poor	
Polychlorotrifluoroethylene (PCTFE)	Good/Excellent	
Polyinyl fluoride (PVF)	Good/Excellent	
Polyvinylidene fluoride (PVDF)	Good/Excellent	
Ethylene-tretrafluoroethylene (ETFE)	Good	
Fluorinated ethylene propylene (FEP)	Fair	
Cellulosics:		Esters degrade less than cellulose.
Esters	Fair	
Cellulose acetate propionate	Fair	
Cellulose acetate butyrate	Fair/Good	
Cellulose, paper, cardboard	Fair/Good	
Polyacetals	Poor	Irradiation causes embrittlement. Colour changes have been noted (yellow to green).
ABS	Good	High-impact grades are not as radiation resistant as standard-impact grades.
Acrylics (PMMA)	Fair/Good	
Polyurethane	Good/Excellent	Aromatic discolors; polyesters more stable than esters. Retains physical properties.
Liquid crystal polymer (LCP)	Excellent	Commercial LCPs excellent; natural LCPs not stable.
Polyesters	Good/Excellent	PBT not as radiation stable as PET.
Thermosets:		
Phenolics	Excellent	Includes the addition of mineral fillers.
Epoxies	Excellent	All curing systems.
Polyesters	Excellent	Includes the addition of mineral or glass fibers.
Allyl diglycol carbonate (polyester)	Excellent	Maintains excellent optical properties after irradiation.
Polyurethanes:		
Aliphatic	Excellent	
Aromatic	Good/Excellent	Darkening can occur. Possible breakdown products could be derived.
Elastomers:		
Urethane	Excellent	
EPDM	Excellent	
Natural rubber	Good/Excellent	Discolours.
Nitrile	Good/Excellent	Discolours. The addition of aromatic plasticizers renders the material more stable to irradiation.
Polychloroprene (neoprene)	Good	Discolours. The addition of aromatic plasticizers renders the material more stable to irradiation.

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Silicone	Good	Phenyl-methyl silicones are more stable than are methyl silicones. Platinum cure is superior to peroxide cure; full cure during manufacture can eliminate most post irradiation effects.
Styrene-butadiene	Good	
Polyacrylic	Poor	
Chlorosulfonated polyethylene	Poor	
Butyl	Poor	Friable, sheds particulars.