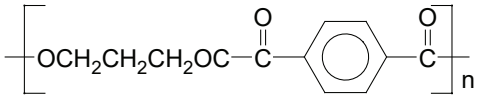
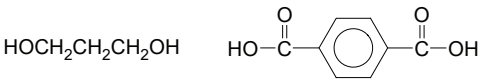
PPT poly(propylene terephthalate)

PARAMETER	UNIT	VALUE	REFERENCES
GENERAL			
Common name	-	poly(propylene terephthalate)	
CAS name	-	poly[oxy(methyl-1,2-ethanediyl)oxycarbonyl-1,4-phenylenecarbonyl]	
Acronym	-	PPT	
CAS number	-	9022-20-2	
Formula			
HISTORY			
Person to discover	-	Winfield, J R; Dickson, J T	
Date	-	1941, 1946	
Details	-	first synthesis; British patent by ICI	
SYNTHESIS			
Monomer(s) CAS number(s)	-		
Monomer(s) molecular weight(s)	dalton, g/mol, amu	504-63-2; 166.13	
Method of synthesis	-	esterification or transesterification (polycondesation) in the presence of catalyst	Berti, C; Bonora, V; Colonna, M; Lotti, N; Sisti, L, Eur. Polym. J., 39, 1595-1601, 2003.
Temperature of polymerization	°C	225-250	
Time of polymerization	h	2-3	
Pressure of polymerization	Pa	vacuum	
Catalyst	-	tetrabutoxytitanium; many other catalysts are discussed in ref.	Mitra, K; Majumdar, S, Mater. Manufac. Proces., 22, 532-40, 2007; Karayannidis, G P; Roupakias, C P; Bikiaris, D N; Achilias, D S, Polymer, 44, 931-42, 2003.
Number average molecular weight, M_n	dalton, g/mol, amu	28,000-34,800	
Mass average molecular weight, M_w	dalton, g/mol, amu	32,000-80,500	
Polydispersity, M_w/M_n	-	2.3-2.4	
Chain-end groups	-	OH, COOH	
STRUCTURE			
Crystallinity	%	60	Motori, A; Saccani, A; Sisti, L, J. Appl. Polym. Sci., 85, 2271-75, 2002.
Cell type (lattice)	-	triclinic	
Cell dimensions	nm	a:b:c=0.453:0.615:1.861	
Unit cell angles	degree	α:β:γ=97:92:111	
Number of chains per unit cell	-	1	
Avrami constants, k/n	-	n=2.53-2.81	Achilias, D S; Bikiaris, D N; Papastergiadis, E; Giliopoulos, D; Papageorgiu, G Z, Macromol. Chem. Phys., 211, 66-79, 2010.

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PARAMETER	UNIT	VALUE	REFERENCES
COMMERCIAL POLYMERS			
Some manufacturers	-	DuPont; Shell	
Trade names	-	Corterra; Sorona	
PHYSICAL PROPERTIES			
Density at 20°C	g cm^{-3}	1.448 (crystalline)	Achilias, D S; Papageorgiou, G Z; Karaayannidis, G P, J. Polym. Sci. B, 42, 3775-96, 2004.
Melting temperature, DSC	°C	223-239	
Glass transition temperature	°C	67-69	
Heat of fusion	J g^{-1}	67-69	Berti, C; Bonora, V; Colonna, M; Lotti, N; Sisti, L, Eur. Polym. J., 39, 1595-1601, 2003.
Dielectric constant at 100 Hz/1 MHz	-	2.27	
MECHANICAL & RHEOLOGICAL PROPERTIES			
Intrinsic viscosity, 25°C	dl g^{-1}	0.72	
PROCESSING			
Typical processing methods	-	injection molding, spinning	
Applications	-	fibers	
Outstanding properties	-	recovery rate, stain resistance, UV stability	