

PPSQ polyphenylsilsesquioxane

PARAMETER	UNIT	VALUE	REFERENCES
GENERAL			
Common name	-	polyphenylsilsesquioxane	
CAS name	-	poly[(1,3-diphenyl-1,3:1,3-disiloxanediyldiene)-1,3-bis(oxy)]	
Acronym	-	PPSQ	
CAS number	-	51350-55-1	
Person to discover	-	Brown, J F	
Date	-	1960	
Details	-	proposed structure	
Monomer(s) structure	-		
Monomer(s) CAS number(s)	-	98-13-5	
Monomer(s) molecular weight(s)	dalton, g/mol, amu	211.55	
Method of synthesis	-	polycondensation in water medium in the presence of emulsifier	
Temperature of polymerization	°C	0-10	
Time of polymerization	h	0.25	
Pressure of polymerization	Pa	atmospheric	
Mass average molecular weight, M_w	dalton, g/mol, amu	6,800-77,100	
Crystallinity	%	amorphous; ladder-like PPSQ forms single crystals from solutions	Li, G Z; Yamamoto, T; Nozaki, K; Hikosaka, M, Polymer, 42, 8435-41, 2001; Li, G Z; Yamamoto, T; Nozaki, K; Hikosaka, M, Polymer, 42, 2827-30, 2000.
Cis content	%	prevailing	
Interchain spacing	nm	1.25; 0.29 (ladder-like)	Li, G Z; Yamamoto, T; Nozaki, K; Hikosaka, M, Polymer, 41, 2827-30, 2000; Liu, C; Liu, Z; Shen, Z; Xie, P; Zhang, R; Yang, J; Bai, F, Macromol. Chem. Phys., 202, 1581-85, 2001.
Some manufacturers	-	Wacker-Belsil	
Trade names	-	SPR	
Density at 20°C	g cm ⁻³	1.34-1.35	
Bulk density at 20°C	g cm ⁻³	0.65	
Color	-	clear to white	
Refractive index, 20°C	-	1.55-1.57	Yasuda, N; Yamamoto, S; Hasegawa, Y; Nobutoki, H; Yanagida, S, Chem. Lett. (Jap), 244-5, 2002.

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PARAMETER	UNIT	VALUE	REFERENCES
Melting temperature, DSC	°C	>50	
Softening point	°C	50-70	
Storage temperature	°C	<30	
Decomposition temperature	°C	>250; 530 (N ₂)	
CHEMICAL RESISTANCE			
Alcohols	-	poor	
Aliphatic hydrocarbons	-	good	
Aromatic hydrocarbons	-	poor	
Esters	-	poor	
Good solvent	-	butyl lactate, diisobutyl adipate, ethanol, ethyl lactate, isopropyl myristate, isostearyl alcohol, oleyl alcohol	
FLAMMABILITY			
Ignition temperature	°C	>100	
Autoignition temperature	°C	>400	
Volatile products of combustion	-	CO, CO ₂ , formaldehyde	
PROCESSING			
Typical processing methods	-	spin-coating	
Applications	-	anti-reflective coating, hair care, microspheres, lipstick, skin care, sunscreens	
BLENDS			
Suitable polymers	-	EPDM, i-PS	
ANALYSIS			
FTIR (wavenumber-assignment)	cm ⁻¹ /-	C-H 3075, 3061, 1423, 1191, 743, 730, 500; C-C 1596; Si-O-Si 1200-1000	Prado, L A S; Radovanovic, E; Pastore, H O; Yoshida, I V P; Torriani, I L, J. Polym. Sci. A, 38, 1580-89, 2000.