

PBAA poly(butadiene-co-acrylonitrile-co-acrylic acid)

PARAMETER	UNIT	VALUE	REFERENCES
GENERAL			
Common name	-	poly(butadiene-co-acrylonitrile-co-acrylic acid)	
CAS name	-	2-propenoic acid, polymer with 1,3-butadiene and 2-propenenitrile	
Acronym	-	PBAN	
CAS number	-	25265-19-4	
RTECS number	-	RW9085000	
SYNTHESIS			
Monomer(s) structure	-	$\text{H}_2\text{C}=\text{CHCH}=\text{CH}_2$ $\text{H}_2\text{C}=\text{CHC}\equiv\text{N}$ $\text{H}_2\text{C}=\text{CHCOOH}$	
Monomer(s) CAS number(s)	-	106-99-0; 107-13-1; 79-10-7	
Monomer(s) molecular weight(s)	dalton, g/mol, amu	54.1; 53.06; 72.06	
Acrylonitrile content	%	Bu/Ac/Aa=62-83/13-32/4-6	Athey, R D, Prog. Org. Coat., 7, 289-329, 1979.
Mass average molecular weight, M_w	dalton, g/mol, amu	140,000-400,000	Pospisil, J; Laudat, J; Fahrnich, J; Havranek, A; Nespurek, S, Mol. Cryst. Liq. Cryst., 229, 195-201, 1993.
PHYSICAL PROPERTIES			
Density at 20°C	g cm^{-3}	0.936	
Refractive index, 20°C	-	1.5200	
Melting temperature, DSC	°C	25	
Decomposition temperature	°C	>100; 100-350 (70% mass lost)	Sell, T; Vyazovkin, S; Wight, C A, Combustion Flame, 119, 1-2, 174-81, 1999.
Activation energy for decomposition	kJ mol^{-1}	260	Sell, T; Vyazovkin, S; Wight, C A, Combustion Flame, 119, 1-2, 174-81, 1999.
Glass transition temperature	°C	-41	Pospisil, J; Laudat, J; Fahrnich, J; Havranek, A; Nespurek, S, Mol. Cryst. Liq. Cryst., 229, 195-201, 1993.
FLAMMABILITY			
Ignition temperature	°C	>110	
WEATHER STABILITY			
Activation energy of photo-oxidation	kJ mol^{-1}	70	
TOXICITY			
NFPA: Health, Flammability, Reactivity rating	-	1/1/0	
Carcinogenic effect	-	not listed by ACGIH, NIOSH, NTP	
Oral rat, LD_{50}	mg kg^{-1}	10,200	
Skin rabbit, LD_{50}	mg kg^{-1}	>2,000	

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PROCESSING			
Applications	-	booster propellant (binder), epoxy modifier, drilling mud, solid rocket propellant, toughening agent in dental compositions	Mante, F K; Wadenya, R O; Bienstock, D A; Mendelson, J; LaFleur, E E, Dental Mater., 26, 164-8, 2010.
BLENDS			
Suitable polymers	-	PA-6, PANI, PVC	
ANALYSIS			
FTIR (wavenumber-assignment)	cm ⁻¹ /-	CN – 2240; C=N – 1650	Pospisil, J; Laudat, J; Fahrnich, J; Havranek, A; Nespurek, S, Mol. Cryst. Liq. Cryst., 229, 195-201, 1993.