Surface Energy Data — Assorted Polymers

Source[a]	Mst. Type[b]	Data[c]	Comments[d]
Cellophane, CAS # 9005-81-6:			
Wu, 1989[273]	Contact angle	γ_s = 45.4 mJ/m^2 (γ_s^d = 29.8, γ_s^p = 15.6); 20°C	Test liquids not known.
CAB: Cellulose acetate butyrate, CAS # 9004-36-8:			
Wu, 1989[273]	Contact angle	γ_s = 34 mJ/m^2; 20°C	Test liquids not known.
Cellulose triacetate, CAS # 9012-09-3:			
Wu, 1982[299]	Critical ST	γ_c = 48.8 mJ/m^2; no temp cited	Test liquids not known.
Eicosane, CAS # 112-95-8:			
Wu, 1989[273]	From polymer melt	γ_s = 28.9 mJ/m^2; 20°C	Direct measurement of polymer melt extrapolated to 20°C. $C_{20}H_{44}$; M = 282.
Ethyl cellulose, CAS # 9004-57-3:			
Wu, 1989[273]	Contact angle	γ_s = 32 mJ/m^2; 20°C	Test liquids not known.
Luner, 2001[144]	Contact angle	θ_W^A = 84.5°; 20°C	Measured by sessile drop method.
Luner, 2001[144]	Contact angle	γ_s = 28.6 mJ/m^2 (γ_s^{LW} = 27.4, γ_s^{AB} = 1.2, γ_s^+ = 0.04, γ_s^- = 8.6); 20°C	Test liquids: water, diiodomethane, formamide, and ethylene glycol. From advancing sessile drops.
EMA: Ethyl methacrylate, CAS # 97-63-2:			
Good, 1998[276]	Contact angle	θ_W^A = 74°; no temp cited	
Ko, 1981[103]	Contact angle	γ_s = 42.8 mJ/m^2 (γ_s^d = 39.1, γ_s^p = 3.7); no temp cited	Various test liquids, calculated from advancing contact angles, using a geometric mean equation.
Ko, 1981[*103*]	Contact angle	γ_s = 41.3 mJ/m^2 (γ_s^d = 38.5, γ_s^p = 2.8); no temp cited	Various test liquids; calculated from advancing contact angles, using a harmonic mean equation.
EPDM: Ethylene-propylene-diene-monomer, CAS # 25038-36-2:			
Bonnerup, 1993[7]	Contact angle	θ_W^Y = 91°, no temp cited	Washed with toluene and isopropanol, then dried overnight.
Bonnerup, 1993[7]	Contact angle	γ_s = 35.5 mJ/m^2 (γ_s^d = 29.7; γ_s^p = 5.8); no temp cited	Washed with toluene and isopropanol, then dried overnight. Test liquids: water and diiodomethane.

Ver Strate, 1999[285]	Unknown	γ_s = 29.4 - 36.8 mJ/m^2; 20°C	Value increases with ethene content.

HEMA: 2-Hydroxyethyl methacrylate (ethylene glycol monoacrylate), CAS #867-77-9:

Good, 1998[276]	Contact angle	θ_W^A = 59°; no temp cited	
Ko, 1981[103]	Contact angle	γ_s = 55.9 mJ/m^2 (γ_s^d = 35.9, γ_s^p = 20.0); no temp cited	Various test liquids; calculated from advancing contact angles, using a geometric mean equation.
Ko, 1981[103]	Contact angle	γ_s = 57.6 mJ/m^2 (γ_s^d = 36.6, γ_s^p = 21.0); no temp cited	Various test liquids; calculated from advancing contact angles, using a harmonic mean equation.

Nylon 2 (polyglycine), CAS # 25718-94-9:

Wu, 1989[273]	Contact angle	γ_s = 50.1 mJ/m^2 (γ_s^d = 27.9, γ_s^p = 22.2); 20°C	Test liquids not known.

Nylon 4, CAS # 24938-56-5:

Wu, 2003[53]	Contact angle	γ_s = 48.5 mJ/m^2 (γ_s^d = 27.8, γ_s^p = 20.7); 20°C	Test liquids not known; from advancing contact angle.

Nylon 6,10, CAS # 9008-66-6:

Omenyi, 1981[178]	Contact angle	θ_W^A = 71.0°; 22°C	
Omenyi, 1981[178]	Contact angle	γ_s = 40.5 mJ/m^2; 22°C	Test liquids not known.

Nylon 6,12, CAS # 24936-74-1:

Matsunaga, 1977[205]	Unknown	γ_s = 67 mJ/m^2 (γ_s^d = 62, γ_s^p = 4.7); no temp cited	No details available.

Nylon 7,7:

Fort, 1964[17]	Critical ST	γ_c = 43 mJ/m^2; 22°C, 65% RH	Test liquids: water, glycerol, and formamide. Polymer samples prepared by bulk melt polymerization and finish formed in contact with aluminum foil.
Fort, 1964[17]	Contact angle	θ_W^A = 70°, 22°C; 65% RH	Polymer samples prepared by bulk melt polymerization and finish formed in contact with aluminum foil.

Nylon 8,8:

Fort, 1964[17]	Critical ST	γ_c = 34 mJ/m^2; 22°C, 65% RH	Test liquids: water, glycerol, and formamide. Polymer samples prepared by bulk melt polymerization and finish formed in contact with aluminum foil.

Fort, 1964[17]	Contact angle	θ_W^A = 86°; 22°C, 65% RH	Polymer samples prepared by bulk melt polymerization and finish formed in contact with aluminum foil.

Nylon 9,9:

Fort, 1964[17]	Critical ST	γ_c = 36 mJ/m²; 22°C, 65% RH	Test liquids: water, glycerol, and formamide. Polymer samples prepared by bulk melt polymerization and finish formed in contact with aluminum foil.
Fort, 1964[17]	Contact angle	θ_W^A = 82°; 22°C, 65% RH	Polymer samples prepared by bulk melt polymerization and finish formed in contact with aluminum foil.

Nylon 10,10:

Fort, 1964[17]	Critical ST	γ_c = 32 mJ/m²; 22°C, 65% RH	Test liquids: water, glycerol, and formamide. Polymer samples prepared by bulk melt polymerization and finish formed in contact with aluminum foil.
Fort, 1964[17]	Contact angle	θ_W^A = 94°; 22°C, 65% RH	Polymer samples prepared by bulk melt polymerization and finish formed in contact with aluminum foil.

Phenoxy resin, CAS # 26402-79-9:

Wu, 1989[273]	Contact angle	γ_s = 43.0 mJ/m²; 20°C	Details not known.

Polyacetylene (polyethyne):

Guiseppe-Elie, 1986[77]	Contact angle	θ_W^Y = 72°; no temp cited	Stored and tested under argon to avoid oxidation; 20% *trans*, 80% *cis*-isomer polyacetylene.
Schonhorn, 1985[284]	Contact angle	γ_s = 51 mJ/m² (γ_s^d = 46.9, γ_s^p = 4.1); 20°C	Test liquids not known; *cis*-isomer polyacetylene.
Schonhorn, 1985[284]	Contact angle	γ_s = 52 mJ/m² (γ_s^d = 49.4, γ_s^p = 2.6); 20°C	Test liquids not known; *trans*-isomer polyacetylene.

Polyacrylamide, CAS # 9003-05-08

Jarvis, 1964[15]	Critical ST	γ_c = 31 mJ/m²; 25°C	Various test liquids, not including water (testing performed under N_2).
Crocker, 1969[111]	Critical ST	γ_c = 35-40 mJ/m²; no temp cited	Test liquids not known.
Kitazaki, 1972[191]	Contact angle	γ_s = 52.3 mJ/m² (γ_s^d = 26.5, γ_s^p = 25.8); no temp cited	Various test liquids; original results split polar component into hydrogen- and non-hydrogen bonding parameters.

Poly(L-alanine), CAS # 25191-17-7:

Wu, 1989[273]	Contact angle	γ_s = 45.2 mJ/m² (γ_s^d = 36.0, γ_s^p = 9.2); 20°C	Test liquids not known.

Poly(benzyl methacrylate), CAS # 25085-83-0:

Fox, 1952[11]	Critical ST	γ_c = 36 mJ/m^2; 20°C	Test liquids not known.

PiBMA: Poly(*iso*-butyl methacrylate), CAS # 9011-15-8:

Wu, 1971[29]	From polymer melt	γ_s = 30.9 mJ/m^2 (γ_s^d = 25.9, γ_s^p = 5.0); 20°C	Measurement by pendant drop of polymer melt extrapolated to 20°C; polarity calculated from interfacial tension with PE by geometric mean equation.
Wu, 1971[29]	From polymer melt	γ_s = 30.9 mJ/m^2 (γ_s^d = 26.6, γ_s^p = 4.3); 20°C	Measurement by pendant drop of polymer melt extrapolated to 20°C; polarity calculated from interfacial tension with PE by harmonic mean. M_v = 35,000.

Poly(butylene isophthalate):

Kasemura, 1979[295]	From polymer melt	γ_s = 47.8 mJ/m^2 (γ_s^d = 34.9, γ_s^p = 12.9); 20°C	Direct measurement of polymer melt extrapolated to 20°C.

PDES: Polydiethylsiloxane, CAS # 63148-61-8:

Fox, 1947[44]	From polymer melt	γ_s = 25.7 mJ/m^2 (γ_s^d = 23.8, γ_s^p = 1.9); 20°C	Measurement of polymer melt by ring method extrapolated to 20°C.

Poly(dimethylaminoethyl methacrylate):

Wu, 1989[273]	Contact angle	γ_s = 36 mJ/m^2; 20°C	Test liquids not known.

PECH: Polyepichlorohydrin, CAS # 24969-06-0:

Crocker, 1969[111]	Critical ST	γ_c = 35 mJ/m^2; no temp cited	Test liquids not known.
Shafrin, 1975[297]	Critical ST	γ_c = 35 mJ/m^2; 20°C	Test liquids not known.
Rastogi, 1969[42]	From polymer melt	γ_s = 43.2 mJ/m^2; 25°C	Measurement by pendant drop of polymer melt extrapolated to 20°C. M = 1,500.

PEI: Polyetherimide, CAS # 61128-46-9:

Kogoma, 1987[66]	Contact angle	θ_W^Y = 85°; no temp cited
Asfardjani, 1991[76]	Contact angle	θ_W^Y = 68°; no temp cited

PES: Polyethersulfone, CAS # 25154-01-2:

Kogoma, 1987[66]	Contact angle	$\theta_W^Y = 69.0^o$; no temp cited	
Cho, 2005[226]	Contact angle	$\theta_W^Y = 68^o$; no temp cited	Measured by sessile drop method.
Cho, 2005[226]	Contact angle	$\gamma_s = 47$ mJ/m^2 ($\gamma_s^d = 40$, $\gamma_s^p = 7$); no temp cited	Test liquids: water and formamide.

PEHA: Poly(2-ethylhexyl acrylate), CAS # 9003-77-4:

Wu, 1971[41]	Critical ST	$\gamma_c = 31$ mJ/m^2 ($\gamma_s^d = 30.1$, $\gamma_s^p = 0.9$); 20^{o}C	Test liquids not known.
Wu, 1971[41]	From polymer melt	$\gamma_s = 30.2$ mJ/m^2 ($\gamma_s^d = 29.4$, $\gamma_s^p = 0.8$); 20^{o}C	Direct measurement of polymer melt extrapolated to 20^{o}C; polarity calculated from interfacial tension with PE by harmonic mean. $M_n = 34{,}000$.
Wu, 1989[273]	From polymer melt	$\gamma_s = 29.2$ mJ/m^2 ($\gamma_s^d = 27.1$, $\gamma_s^p = 2.2$); 20^{o}C	Direct measurement of polymer melt extrapolated to 20^{o}C.

PEHMA: Poly(2-ethylhexyl methacrylate), CAS # 25719-51-1:

Wu, 1971[41]	From polymer melt	$\gamma_s = 28.8$ mJ/m^2; 20^{o}C	Direct measurement of polymer melt extrapolated to 20^{o}C. $M_v = 64{,}000$.

Poly(heptadecafluorooctyl methacrylate):

Wu, 1989[273]	Contact angle	$\gamma_s = 15.3$ mJ/m^2 ($\gamma_s^d = 13.9$, $\gamma_s^p = 1.4$); 20^{o}C	Test liquids not known.

Poly(heptafluoroisopropyl acrylate):

Pittman, 1968[294]	Contact angle	$\gamma_s = 14$ mJ/m^2 ; 20^{o}C	Test liquids not known.

Poly(heptafluoroisopropyl methacrylate):

Pittman, 1968[294]	Contact angle	$\gamma_s = 15$ mJ/m^2 ; 20^{o}C	Test liquids not known.

Poly(hexachlorobutadiene):

Kaelble, 1974[292]	Contact angle	$\gamma_s = 41.5$ mJ/m^2 ($\gamma_s^d = 40.7$, $\gamma_s^p = 0.8$); 20^{o}C	Test liquids not known.

PnHMA: Poly(hexyl methacrylate), CAS # 25087-17-6:

Kamagata, 1974[301]	Critical ST	$\gamma_c = 27.5$ mJ/m^2; 20^{o}C	Test liquids not known.
Wu, 1971[41]	From polymer melt	$\gamma_s = 30.0$ mJ/m^2 ($\gamma_s^d = 28.1$, $\gamma_s^p = 1.9$); 20^{o}C	Direct measurement of polymer melt extrapolated to 20^{o}C. $M_v = 52{,}000$.
Surface-tension.de, 2007[110]	Unknown	$\gamma_s = 30.0$ mJ/m^2 ($\gamma_s^d = 27.0$, $\gamma_s^p = 3.0$); 20^{o}C	No details available.

Poly(2-hydroxyethyl methacrylate), CAS # 24249-16-5:

Wu, 1971[41]	Critical ST	γ_c = 37 mJ/m^2; 20°C	Test liquids not known.

Poly(isoprene), CAS # 9003-31-0:

Lee, 1967[221]	Contact angle	γ_s = 32 mJ/m^2; no temp cited	Test liquids not known; *cis*-isomer polyisoprene.
Lee, 1967[221]	Contact angle	γ_s = 31 mJ/m^2; no temp cited	Test liquids not known; *trans*-isomer polyisoprene.
Lee, 1967[221]	Contact angle	γ_s = 34 mJ/m^2; no temp cited	Test liquids not known; cyclized polyisoprene.

Poly(lauryl methacrylate) (poly(dodecyl methacrylate)), CAS # 25719-52-2:

Kamagata, 1974[301]	Critical ST	γ_c = 21.3 mJ/m^2; 20°C	Test liquids not known.
Wu, 1989[273]	Contact angle	γ_s = 32.8 mJ/m^2; 20°C	Test liquids not known.

Poly(4-methyl pentene-1):

Heggs, 1992[287]	Contact angle	γ_s = 25 mJ/m^2; 20°C	Test liquids not known.

PMS: Poly(α-methyl styrene), CAS # 25014-31-7:

Hata, 1968[37]	From polymer melt	γ_s = 38.7 mJ/m^2; 20°C	Measurement by sessile bubble of polymer melt extrapolated to 20°C. M_n = 3000.

Polymethylphenylsiloxane, CAS # 9005-12-3:

Fox, 1947[44]	From polymer melt	γ_s = 26.1 mJ/m^2; 20°C	Measurement by ring method extrapolated to 20°C.

Poly(methylphenylsilylene):

Fujisaka, 1993[288]	Unknown	γ_s = 43.3 mJ/m^2; no temp cited	Details not known.
Fujisaka, 1993[288]	Unknown	γ_s = 44.1 mJ/m^2; no temp cited	Details not known.

Poly(nonafluoroisobutyl acrylate):

Pittman, 1968[294]	Contact angle	γ_s = 14 mJ/m^2; 20°C	Test liquids not known.

Poly(octyl methacrylate):

Kamagata, 1974[301]	Critical ST	γ_c = 23.5 mJ/m^2; 20°C	Test liquids not known.

Poly(phenyl methacrylate):

Toyama, 1974[302]	Critical ST	γ_c = 35 mJ/m^2; 20°C	Test liquids not known.

PPO: Poly(phenylene oxide), CAS # 25134-01-4:

Markgraf, 2005[62]	Critical ST	γ_c = 47 mJ/m^2; no temp cited	Test liquids not known.
Schoff, 2003[263]	Contact angle	γ_s = 46 mJ/m^2 (γ_s^d = 36; γ_s^p = 10); no temp cited	Test liquids not known; by geometric mean equation. Noryl FN215.

Poly(phosphazene):

Allcock, 1995[289]	Critical ST	γ_c = 16.5 mJ/m^2; no temp cited	Test liquids not known; by Zisman plot.
Allcock, 1995[289]	Contact angle	γ_s = 16 mJ/m^2; no temp cited	Test liquids not known.
Reichert, 1982[290]	Contact angle	γ_s = 14.4 - 16.5 mJ/m^2; no temp cited	Test liquids not known; measured after exposure to prolonged UV irradiation.

PnPMA: Poly(*n*-propyl methacrylate), CAS # 2210-79-9:

Wu, 1971[41]	Critical ST	γ_c = 32 mJ/m^2; 20°C	Test liquids not known.
Wu, 1971[41]	From polymer melt	γ_s = 33.2 mJ/m^2; 20°C	Direct measurement of polymer melt extrapolated to 20°C. M_v = 8500.

Poly(propylene isophthalate):

Kasemura, 1979[295]	From polymer melt	γ_s = 49.3 mJ/m^2 (γ_s^d = 35.1, γ_s^p = 14.2); 20°C	Direct measurement of polymer melt extrapolated to 20°C.

Poly(stearyl methacrylate), CAS # 25639-21-8:

Kamagata, 1974[301]	Critical ST	γ_c = 20.8 mJ/m^2; 20°C	Test liquids not known.
Wu, 2003[53]	Contact angle	γ_s = 36.3 mJ/m^2; 20°C	Test liquids not known.

PTHF: Poly(tetrahydrofuran), CAS # 25190-06-1:

Wu, 1971[29]	From polymer melt	γ_s = 31.9 mJ/m^2 (γ_s^d = 27.4, γ_s^p = 4.5); 20°C	Measurement by pendant drop of polymer melt extrapolated to 20°C; polarity calculated from interfacial tension with PE by geometric mean equation.
Wu, 1971[29]	From polymer melt	γ_s = 31.9 mJ/m^2 (γ_s^d = 27.0, γ_s^p = 4.9); 20°C	Measurement by pendant drop of polymer melt extrapolated to 20°C; polarity calculated from interfacial tension with PE by harmonic mean.

Poly(tetramethylene oxide):

Wu, 1982[18]	Calculated	γ_s = 33.7 mJ/m^2; 20^{o}C	Calculated from cohesive energy density and solubility parameters.
Surface-tension.de, 2007[110]	Unknown	γ_s = 31.9 mJ/m^2 (γ_s^d = 27.4, γ_s^p = 4.5); 20^{o}C	No details available.

Poly(vinyl butyral), CAS # 63148-65-2:

Kutsch, 1993[102]	Critical ST	γ_c = 28 mJ/m^2; no temp cited	Test liquids not known.
Wu, 1971[41]	Contact angle	γ_s = 38 mJ/m^2; 20^{o}C	Test liquids not known.

Poly(vinyl butyrate):

Wu, 1989[273]	From polymer melt	γ_s = 31.1 mJ/m^2 (γ_s^d = 25.8, γ_s^p = 5.3); 20^{o}C	Direct measurement of polymer melt extrapolated to 20^{o}C.

Poly(vinyl decanoate):

Wu, 1989[273]	From polymer melt	γ_s = 28.9 mJ/m^2 (γ_s^d = 27.1, γ_s^p = 1.8); 20^{o}C	Direct measurement of polymer melt extrapolated to 20^{o}C.

Poly(vinyl dodecanoate):

Wu, 1989[273]	From polymer melt	γ_s = 29.1 mJ/m^2 (γ_s^d = 27.8, γ_s^p = 1.3); 20^{o}C	Direct measurement of polymer melt extrapolated to 20^{o}C.

Poly(vinyl ethyl ether) (polyethoxyethylene), CAS # 25104-37-4:

Kitazaki, 1972[293]	Contact angle	γ_s = 36 mJ/m^2; 20^{o}C	Test liquids not known.

Poly(vinyl formal), CAS # 63450-15-7:

Shafrin, 1975[297]	Critical ST	γ_c = 39 mJ/m^2; 20^{o}C	Test liquids not known.

Poly(vinyl hexadecanoate):

Wu, 1989[273]	From polymer melt	γ_s = 30.9 mJ/m^2 (γ_s^d = 29.8, γ_s^p = 1.1); 20^{o}C	Direct measurement of polymer melt extrapolated to 20^{o}C.

Poly(vinyl hexanoate):

Wu, 1989[273]	From polymer melt	γ_s = 28.9 mJ/m^2 (γ_s^d = 25.1, γ_s^p = 3.8); 20^{o}C	Direct measurement of polymer melt extrapolated to 20^{o}C.

Poly(vinyl octanoate):

Wu, 1989[273]	From polymer melt	γ_s = 28.7 mJ/m^2 (γ_s^d = 26.5, γ_s^p = 2.2); 20°C	Direct measurement of polymer melt extrapolated to 20°C.

Poly(vinyl proprionate), CAS # 25035-84-1:

Wu, 1989[273]	From polymer melt	γ_s = 34.0 mJ/m^2 (γ_s^d = 26.5, γ_s^p = 7.5); 20°C	Direct measurement of polymer melt extrapolated to 20°C.

PVP: Poly(vinyl pyrrolidone), CAS # 9003-39-8:

Lee, 1999[116]	Contact angle	γ_s = 48.5 mJ/m^2 (γ_s^{LW} = 43.4, γ_s^{AB} = 5.1, γ_s^+ = 0.4, γ_s^- = 15.3); 20°C	Test liquids water, alpha-bromonaphthalene, diiodomethane, formamide, and glycerin; acid-base analysis, based on reference values for water of γ^+ = 34.2 mJ/m^2 and γ = 19 mJ/m^2.
van Oss, 2006[26]	Contact angle	γ_s = 43.4 mJ/m^2 (γ_s^{LW} = 43.4, γ_s^{AB} = 0.0, γ_s^+ = 0.0, γ_s^- = 29.7); 20°C	Test liquids water, alpha-bromonaphthalene, diiodomethane, formamide, and glycerin; acid-base analysis.

Poly(xylylene) (parylene):

Nowlin, 1980[291]	Contact angle	γ_s = 46.3 mJ/m^2 (γ_s^d = 45.7; γ_s^p = 0.6); 20°C	Test liquids not known.