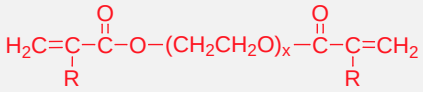
Crosslinking Agents

Crosslinking is the formation of chemical links between molecular chains to form a three-dimensional network of connected molecules. The vulcanization of rubber using elemental sulfur is an example of crosslinking, converting raw rubber from a weak plastic to a highly resilient elastomer. The strategy of covalent crosslinking is used in several other technologies of commercial and scientific interest to control and enhance the properties of the resulting polymer system or interface, such as thermosets and coatings.[1-3] Crosslinking has been employed in the synthesis of ion-exchange resins[4] and stimuli-responsive hydrogels[5] made from polymer molecules containing polar groups. As polyelectrolytes, hydrogels are inherently water soluble. To make them insoluble, they are chemically crosslinked during manufacture or by a second reaction following that of polymerization of the starting monomers. The degree of crosslinking, quantified in terms of the crosslink density, together with the details of the molecular structure, have a profound impact on the swelling characteristics of the crosslinked system.

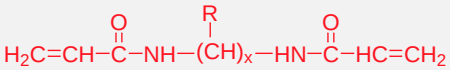
A sampling of **crosslinking monomers** available from Aldrich is provided below. For our complete selection of crosslinking monomers, reactive oligomers, polyisocyanate oligomers, and functional, crosslinkable polymers,[6] search our product database using our NEW Web-based structure searching tool at **www.sigma-aldrich.com**, or email us at **aldrich@sial.com** to request your FREE copy of the current **Aldrich Catalog/Handbook**.

Derivatives of ethylene glycol di(meth)acrylate



X	R	Cat. No.	Crosslinking Monomer	Unit Sizes
1	H	48,079-7	Ethylene glycol diacrylate, tech., 90%	5mL; 25mL
2	H	43,743-3	Di(ethylene glycol) diacrylate, tech., 75%	100mL; 500mL
4	H	39,880-2	Tetra(ethylene glycol) diacrylate, tech.	250mL; 1L
1	CH_3	33,568-1	Ethylene glycol dimethacrylate, 98%	5mL; 100mL; 500mL
2	CH_3	40,900-6	Di(ethylene glycol) dimethacrylate, 95%	250mL; 1L
3	CH_3	26,154-8	Tri(ethylene glycol) dimethacrylate, 95%	5mL; 250mL; 1L

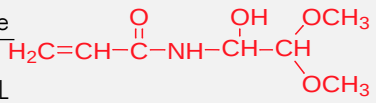
Derivatives of methylenebisacrylamide



X	R	Cat. No.	Crosslinking Monomer	Unit Sizes
1	H	14,607-2	*N,N'*-Methylenebisacrylamide, 99%	100g; 500g
1	H	14,832-6	*N,N'*-Methylenebisacrylamide, 99+%, electrophoresis grade	25g; 100g
2	OH	29,438-1	*N,N'*-(1,2-Dihydroxyethylene)bisacrylamide, 97%	5g; 25g

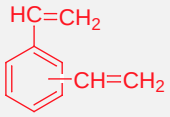
Formaldehyde-free crosslinking agent

Cat. No.	Crosslinking Monomer	Unit Size
47,906-3	*N*-(1-Hydroxy-2,2-dimethoxyethyl)acrylamide, 50 wt. % solution in water	10mL



DVB

Cat. No.	Crosslinking Monomer	Unit Sizes
16,909-9	Divinylbenzene, tech., 55%, mixture of isomers	5mL; 250mL; 1L
41,456-5	Divinylbenzene, tech., 80%, mixture of isomers	250mL; 1L



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References: (1) Stevens, M.P. *Polymer Chemistry: An Introduction*, 3rd ed.; Oxford University Press: New York, NY, 1999; Aldrich Cat. No. Z41,255-4. (2) DeBord, T.J., Jr.; Schick, M. *Ink World*, April 1999, 47. (3) Wicks, Z.W., Jr.; Jones, F.N.; Pappas, S.P. *Organic Coatings: Science and Technology*, 2nd ed.; Wiley-Interscience: New York, NY, 1999; Aldrich Cat. No. Z41,244-9. (4) *Specialty Polymers*; Dyson, R.W., Ed.; Chapman and Hall: New York, NY, 1987; Aldrich Cat. No. Z22,414-6. (5) Lowe, A.B.; McCormick, C.L. *Polym. Prepr.* 1999, *40(2)*, 187ff. (6) Klärner, G. et al. *Chem. Mater.* 1999, *11*, 1800.

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