

Monomers for Ophthalmic Applications

Polymers used in ophthalmic applications have evolved into a variety of specialized types each with a different combination of properties. Many different monomers are used in producing the variety of lenses now fabricated. Each monomer contributes its own properties. Formulating an optimized polymer often requires a delicate balance of the amounts of the component monomers.

Polysciences, Inc. offers an extensive range of monomers to meet the special needs in producing polymers for the major types of ophthalmic lenses - eyeglass lenses, contact lenses, and intraocular lens implants. Most of these monomers can be supplied at high purity for producing contact lenses and intraocular lens implants and are available in bulk quantities.

Copolymers of two or more monomers are generally required to produce the proper combination of properties required in specific types of lenses. Lenses can be prepared which are hard, soft, water permeable, water impermeable, oxygen permeable, UV light absorbing, having low coefficients of friction, resistant to abrasion, containing or releasing drugs or bactericide, or combinations of these attributes.

Ophthalmic monomers from Polysciences, Inc. are grouped below by properties. The various groups can differ considerably from each other in properties other than the principal property under which they are listed.

Hydrophilic (Hydrogel-forming) Monomers

Cat. #	Description	T _g (°C)	R.I.
04180	Glycerol methacrylate	NA	1.4620
04675	2-Hydroxyethyl methacrylate	55	1.4530
08242	N-(2-Hydroxypropyl) methacrylamide	NA	solid at RT
00730	Hydroxypropyl methacrylate	76	1.4470
16664	PEG (200) monomethacrylate monomethyl ether	NA	1.4520
16665	PEG (400) monomethacrylate monomethyl ether	-62	1.4570
04000	N-Vinyl-2-pyrrolidone	175	1.5120

UV-absorbing Monomers

Cat. #	Description	T _g (°C)	R.I.
19931	4-(2-Acryloxyethoxy)-2-hydroxybenzophenone	NA	solid at RT
23350	4-Methacryloxy 2-hydroxybenzophenone	NA	solid at RT
23602	2-Naphthyl methacrylate	NA	solid at RT
01036	9-Vinylanthracene	NA	solid at RT

Crosslinking Monomers

Cat. #	Description	T _g (°C)	R.I.
24030	Ethylene glycol dimethacrylate	NA	1.4540
06389	1,4-Phenylene diacrylate	NA	1.5307
04675	Hexamethylene dimethacrylate	NA	1.4525
00669	PEG (200) diacrylate	NA	1.4639

...many others available with varying chain lengths and hydrophobicity

Monomers for Oxygen (Gas) Permeability

Perfluoroalkyl esters and other monomers listed under Low Refractive Index

T_g: Glass Transition Temperature of Homopolymers

R.I.: Refractive Index of Monomers

NA: Not Available

Neutral Hydrophobic Monomers

Cat. #	Description	T _g (°C)	R.I.
02056	Butyl methacrylate	20	1.4150
01952	Allyl diglycol carbonate	NA	1.4500
02159	Diallyl phthalate	NA	1.5190
00834	Methyl methacrylate	105	1.4140
23355	N-Octyl methacrylate	20	1.4373

Ionic Monomers

Cat. #	Description	T _g (°C)	R.I.
21200	N-(3-Aminopropyl) methacrylamide	NA	solid at RT
00213	2-(N,N-Dimethylamino) ethyl methacrylate	18	1.4400
00212	Methacrylic acid	185	1.4310
21002	2-Aminoethyl methacrylate	NA	solid at RT

High Refractive Index

Cat. #	Description	T _g (°C)	R.I.
04253	Pentabromophenyl methacrylate	NA	NA
24286	Benzhydryl methacrylate	NA	~1.56 of polymer

...many others available for forming high R.I. polymers

Low Refractive Index

Cat. #	Description	T _g (°C)	R.I.
00767	1H,1H,7H-Dodecafluoroheptyl methacrylate	13	1.3490
21039	1H,1H-Heptafluorobutyl acrylate	30	1.3310
05632	1H,1H,3H-Hexafluorobutyl methacrylate	NA	1.3610
02401	Hexafluoro-iso-propyl methacrylate	NA	1.3310
21044	1H,1H,5H-Octafluoropentyl acrylate	-35	1.3490
21045	1H,1H,5H-Octafluoropentyl methacrylate	36	1.3580
01718	2,2,2-Trifluoroethyl acrylate	-10	1.3500
02622	2,2,2-Trifluoroethyl methacrylate	80	1.3610