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ADVANCED FUNCTIONAL POLYMERS FOR MEDICAL APPLICATIONS

Ideal biomedical materials possess **biological properties** needed to interact with cellular environments, and **physicochemical properties** required for a desired application.

SPECIFIC POLYMERS proposes a **wide range of polymers** designed specifically for use in **biomedical applications**.

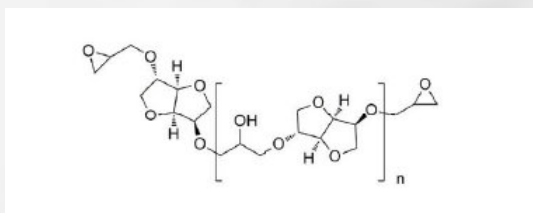
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Bioresorbable or biocompatible polymers

Bioresorbable polymers can be tailored for controlled degradation through numerous functional groups. They can be used for **sutures**, **drug delivery** and **tissue engineering**.

EPOXIDES

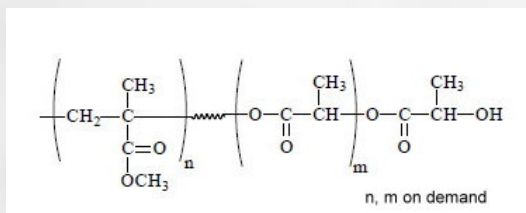
Polyisobornide diglycidyl ether : **Bisphenol A substitute**¹



Ref : SP-9S-5-001

LACTIDES

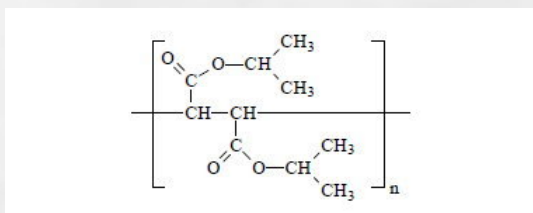
PMMA-co-PLA (diblock)



Ref : SP-4P-0-004

FUMARICS

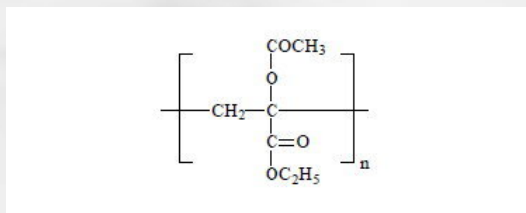
Polydiisopropyl fumarate²



Ref : SP-9P-0-001

ACRYLICS

Poly(alpha-acetoxy ethyl acrylate)



Ref : SP-4P-0-005

Diblock copolymers for drug delivery

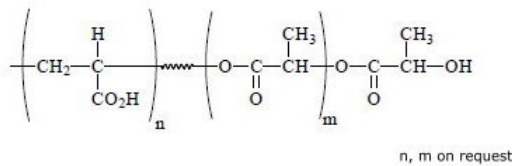
Nowadays, **targeted and controlled release of drugs** is subjected to many researches. Polymeric materials intended for this application need to combine different properties.

Amphiphilic and double hydrophilic copolymers enable the formation of micelles for drug entrapment, whereas **stimuli-responsive polymers** permit a controlled delivery of drug³.

DIBLOCK AMPHIPHILIC COPOLYMERS

PAA-co-PLA⁴

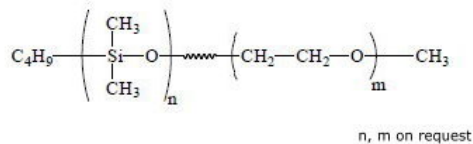
PEO-co-PDMS



Ref : SP-4P-0-007

DIBLOCK HYDROPHILIC COPOLYMERS

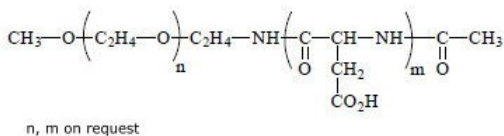
PEO-co-Polyglutamic Acid



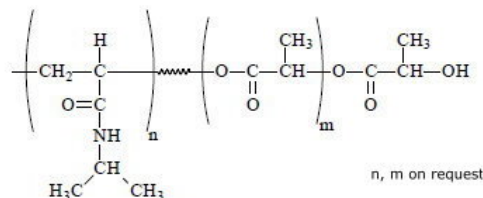
Ref : SP-8P-3-001

DIBLOCK THERMoresponsive COPOLYMERS

PNIPAM-co-PLA



Ref : SP-1P-0-001



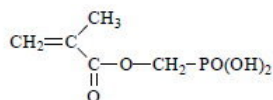
Ref : SP-3P-0-006

Dental and implant materials

Dental and implant materials need to possess excellent mechanical and adhesion performances associated with **biostability**. Building blocks and polymers containing **phosphonic acid functions** are especially dedicated to this application, because of their ability in binding to bones and various calcium phosphates⁵.

ACRYLICS

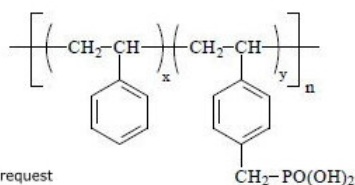
MAPC1 Acid



Ref : SP-41-007

STYRENICS

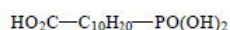
Styrene-co-Styphos Acid



Ref : SP-5P-1-003

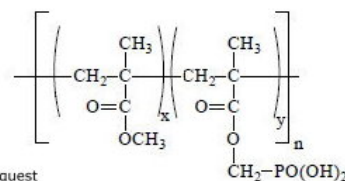
ALKYL CARBOXYLIC ACIDS

Carboxyl C11 Phosphonic Acid



Ref : SP-3-10-003

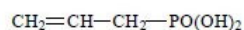
MMA-co-MAPC1 Acid



Ref : SP-4P-1-003

ALLYLICS

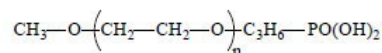
Allyl Phosphonic Acid



Ref : SP-61-006

POLYETHYLENE GLYCOLS

PEO Phosphonic Acid



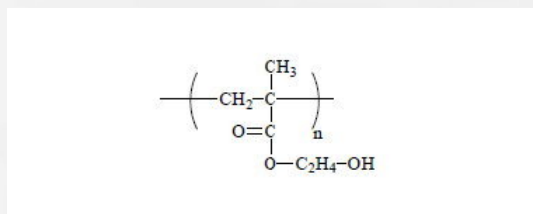
Ref : SP-1P-1-001

Polymers for ophthalmology

Polymers and copolymers used in ophthalmologic applications, especially for producing contact lenses, combine specific features: **hydrophilicity**, **oxygen permeability** and abilities in forming **hydrogel structures** via functional groups⁶.

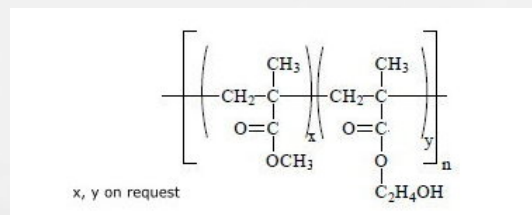
HYDROXYETHYL METHACRYLATE "HEMA" BASED POLYMERS

HEMA Homopolymer



Ref : SP-4P-3-004

MMA-co-HEMA

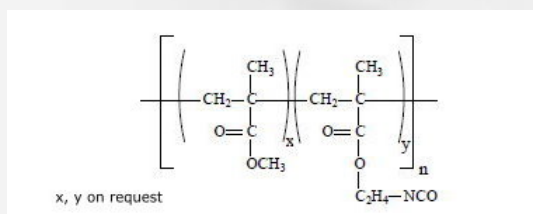


x, y on request

Ref : SP-4P-3-003

OTHER METHACRYLIC FUNCTIONAL COPOLYMERS

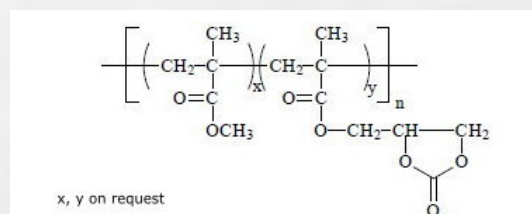
MMA-co-IEM



x, y on request

Ref : SP-4P-4-002

MMA-co-Glycerol carbonate methacrylate



x, y on request

Ref : SP-4P-0-002

References

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- ²M.S. Cortizo, M.S. Molinuevo, A.M. Cortizo, Biocompatibility and biodegradation of polyester and polyfumarate based-scaffolds for bone tissue engineering, *Journal of Tissue Engineering and Regenerative Medicine* 2 (2008) 33-42
- ³L.Q. Qiu, Y.H. Bae, Polymer architecture and drug delivery, *Pharmaceutical Research* 23 (2006) 1-30
- ⁴Y.N. Xue, Z.Z. Huang, J.T. Zhang, M. Liu, M. Zhang, S.W. Huang, R.X. Zhuo, Synthesis and self-assembly of amphiphilic poly(acrylic acid-b-DL-lactide) to form micelles for pH-responsive drug delivery, *Polymer* 50 (2009) 3706-3713
- ⁵M.J. Phillips, P. Duncanson, K. Wilson, J.A. Darr, D.V. Griffiths, I. Rehman, Surface modification of bioceramics by grafting of tailored allyl phosphonic acid, *Advances in Applied Ceramics* 104 (2005) 261-267
- ⁶B.V. Slaughter, S.S. Khurshid, O.Z. Fisher, A. Khademhosseini, N.A. Peppas, Hydrogels in regenerative medicine, *Advanced Materials* 21 (2009) 3307-3329

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