

Some Common Addition Polymers

| Name(s) | Formula | Monomer | Properties | Uses |
|---|---|--|---|---|
| Polyethylene low density (LDPE) | $-(\text{CH}_2-\text{CH}_2)_n-$ | ethylene $\text{CH}_2=\text{CH}_2$ | soft, waxy solid | film wrap, plastic bags |
| Polyethylene high density (HDPE) | $-(\text{CH}_2-\text{CH}_2)_n-$ | ethylene $\text{CH}_2=\text{CH}_2$ | rigid, translucent solid | electrical insulation bottles, toys |
| Polypropylene (PP) different grades | $-\text{[CH}_2-\text{CH}(\text{CH}_3)]_n-$ | propylene $\text{CH}_2=\text{CHCH}_3$ | <u>atactic</u> : soft, elastic solid <u>isotactic</u> : hard, strong solid | similar to LDPE carpet, upholstery |
| Poly(vinyl chloride) (PVC) | $-(\text{CH}_2-\text{CHCl})_n-$ | vinyl chloride $\text{CH}_2=\text{CHCl}$ | strong rigid solid | pipes, siding, flooring |
| Poly(vinylidene chloride) (Saran A) | $-(\text{CH}_2-\text{CCl}_2)_n-$ | vinylidene chloride $\text{CH}_2=\text{CCl}_2$ | dense, high-melting solid | seat covers, films |
| Polystyrene (PS) | $-\text{[CH}_2-\text{CH}(\text{C}_6\text{H}_5)]_n-$ | styrene $\text{CH}_2=\text{CHC}_6\text{H}_5$ | hard, rigid, clear solid soluble in organic solvents | toys, cabinets packaging (foamed) |
| Polyacrylonitrile (PAN, Orlon, Acrilan) | $-(\text{CH}_2-\text{CHCN})_n-$ | acrylonitrile $\text{CH}_2=\text{CHCN}$ | high-melting solid soluble in organic solvents | rugs, blankets clothing |
| Polytetrafluoroethylene (PTFE, Teflon®) | $-(\text{CF}_2-\text{CF}_2)_n-$ | tetrafluoroethylene $\text{CF}_2=\text{CF}_2$ | resistant, smooth solid | non-stick surfaces electrical insulation |
| Poly(methyl methacrylate) (PMMA, Lucite, Plexiglas) | $-\text{[CH}_2-\text{C}(\text{CH}_3)\text{CO}_2\text{CH}_3]_n-$ | methyl methacrylate $\text{CH}_2=\text{C}(\text{CH}_3)\text{CO}_2\text{CH}_3$ | hard, transparent solid | lighting covers, signs skylights |
| Poly(vinyl acetate) (PVAc) | $-(\text{CH}_2-\text{CHOCOCH}_3)_n-$ | vinyl acetate $\text{CH}_2=\text{CHOCOCH}_3$ | soft, sticky solid | latex paints, adhesives |
| cis-Polyisoprene natural rubber | $-\text{[CH}_2-\text{CH}=\text{C}(\text{CH}_3)-\text{CH}_2]_n-$ | isoprene $\text{CH}_2=\text{CH}-\text{C}(\text{CH}_3)=\text{CH}_2$ | soft, sticky solid | requires vulcanization for practical use |
| Polychloroprene (cis + trans) (Neoprene) | $-\text{[CH}_2-\text{CH}=\text{CCl}-\text{CH}_2]_n-$ | chloroprene $\text{CH}_2=\text{CH}-\text{CCl}=\text{CH}_2$ | tough, rubbery solid | synthetic rubber oil resistant |