



# ATR of Polymers

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## 4107 ATR of Polymers - 2,390 Spectra

We have seen the steady and rapid expansion of the synthetic materials industry over the last five decades. Increasingly, one encounters home and office products as well as high strength industrial materials and space age components that are made from polymeric materials. With the growing importance of these materials, manufacturers and users have turned to sophisticated analytical techniques in order to develop a comprehensive understanding of their chemical make-up and expected performance.

Infrared spectroscopy is, perhaps, the most commonly used analytical technique for polymer and plastics analysis. Analytical applications include identification, quality control, deterioration studies, materials selection, plus other applications such as classroom instruction. These applications in nearly all cases require some type of reference spectra with which to substantiate one's analytical suspicions or, to design an analytical approach.

The ATR of POLYMERS DATABASE is useful in all such applications. For those doing identification, a reference spectrum is nearly always used to confirm final identification. For quality control, reference spectra are used for selecting unique absorption bands for quantitative analysis or to monitor chemical changes during processing or actual usage. Reference spectra can also be used for determining which polymeric structure is suited for either transmitting or absorbing infrared radiation in a particular spectral region. Finally, the database is particularly useful in materials selection. Here, one generally performs an initial identification by matching an unknown spectrum against a reference spectrum. Once the unknown is identified and its chemical class revealed, the database provides a collection of infrared spectra for products in that same chemical class with the same or similar characteristics as the identified material. Manufacturer source information is presented with each reference spectrum so that the availability of a selected material that matches the measured infrared spectrum can be determined by contacting the specified commercial producer.

Bio-Rad has compiled a collection of monomers, polymers and precursors commonly encountered in both industry and academia. This database contains 2397 FT-IR reference spectra selected to help satisfy a high percentage of analytical applications for this area of technology. The spectra contain both reference spectra for materials identified by chemical name and commercial name. The spectra are arranged into chemical classes, and have been placed in order of increasing chemical complexity within each class.

Below is a breakdown of the monomer and polymer classes presented in the database.

## Classifications:

### ALIPHATIC HYDROCARBONS

Polyethylenes	161
Polypropylenes	70
Petroleum Hydrocarbon Resins	21
Synthetic Waxes	6
Polybutenes and Butyl Rubbers	18
Polybutadienes	15
Polyisoprenes & Natural Rubbers	14
Aliphatic Hydrocarbon Polymers & Copolymers	33

### CYCLIC UNSATURATED HYDROCARBONS

Coumarone-Indene Resins	12
Polyterpenes	9
Cyclic Unsaturated Hydrocarbon Resins	2

### AROMATIC HYDROCARBONS

Polystyrenes	59
Styrene-Butadiene Copolymers	13
Other Styrene Copolymers	25
Aromatic Vinyl Hydrocarbons	16
Fluorinated Hydrocarbons	34
Chlorinated Hydrocarbon	26
Silicone Polymers	31

### POLYMERS CONTAINING NITRILE LINKAGE

Acrylonitrile-Butadiene-Styrene Resins	30
Polyurethanes and Urethane Prepolymers	111
Butadiene-Acrylonitrile Copolymers	16
Styrene-Acrylonitrile Copolymers	3
Other Nitrile Polymers	9
Thioplasts	12
Polyethers	72
Anhydride Polymers	24

### EPOXY RESINS

Unmodified Epoxy Resins	24
Modified Epoxy Resins	37
Ionomers	4

### ALIPHATIC VINYL AND VINYLIDENE

#### POLYMERS

Vinyl Chloride Homopolymers	40
Plasticized Polyvinyl Chlorides	42
Vinyl Chloride Copolymers	23
Polyvinyl Alcohols	39
Polyvinyl Ethers and Acetals	10
Polyvinyl Esters	6
Polyvinyl Acetate Copolymers	53
Polyvinylidene Polymers	5
Other Vinyl Polymers	43

### CELLULOSE DERIVATIVES

Celluloses	32
Miscellaneous Carbohydrate Derivatives	18

### PHENOPLASTS

Phenolic Resins	33
Modified Phenolic Resins	2

### ACRYLIC AND METHACRYLIC POLYMERS

Acrylic Copolymers	25
Polyacrylic and Polymethacrylic Esters	70
Polyacrylic and Polymethacrylic Acids & Salts	15

### POLYESTERS

Polyesters	87
Modified Polyesters	29
Polycarbonates	40

Alkyds	6
Rosins and Rosin Derivatives	25
Aminoplasts	15
Polyamides	171
Polyimides	22

### HETEROCYCLIC VINYL POLYMERS

Polyvinylpyrrolidones and Polyvinylpyridines	22
Polysulfones	17
Sulfonated Polymers	10
Ion Exchange Resins	19
UV Light Absorbers	19
Miscellaneous Polymers	96

### MONOMERS AND PRECURSORS - 458

Hydrocarbons	2
Alcohols and Phenols	54
Ethers	4
Oxides and Peroxides	61
Aldehydes, Ketones and Quinones	17
Phthalates	24
Compounds Containing Nitrogen	63
Ureas, Amides and Cyanurates	52
Compounds containing Halogen	35
Compounds containing Sulfur	51
Compounds containing Phosphorous	12
Compounds containing Silicon	6
Acrylates and Methacrylates	33
Carboxylic Acids	14
Carboxylic Acid Esters	6
Carboxylic Acid Salts	16
Organometallics	20
Miscellaneous Monomeric Compounds	43



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