

Organic composition analysis

Composition analysis of various chemical products is possible by applying high level separation techniques and appropriate analytical methods with wealth of experiences. A procedure of organic composition analysis and application results on various industrial materials are introduced.

Procedure of organic composition analysis

◎ Samples

UV curable resin, Sealing resin, Functional Film, Plating solution, Paint, Ink, Liquid crystal, Electrolyte, Hair care product etc.

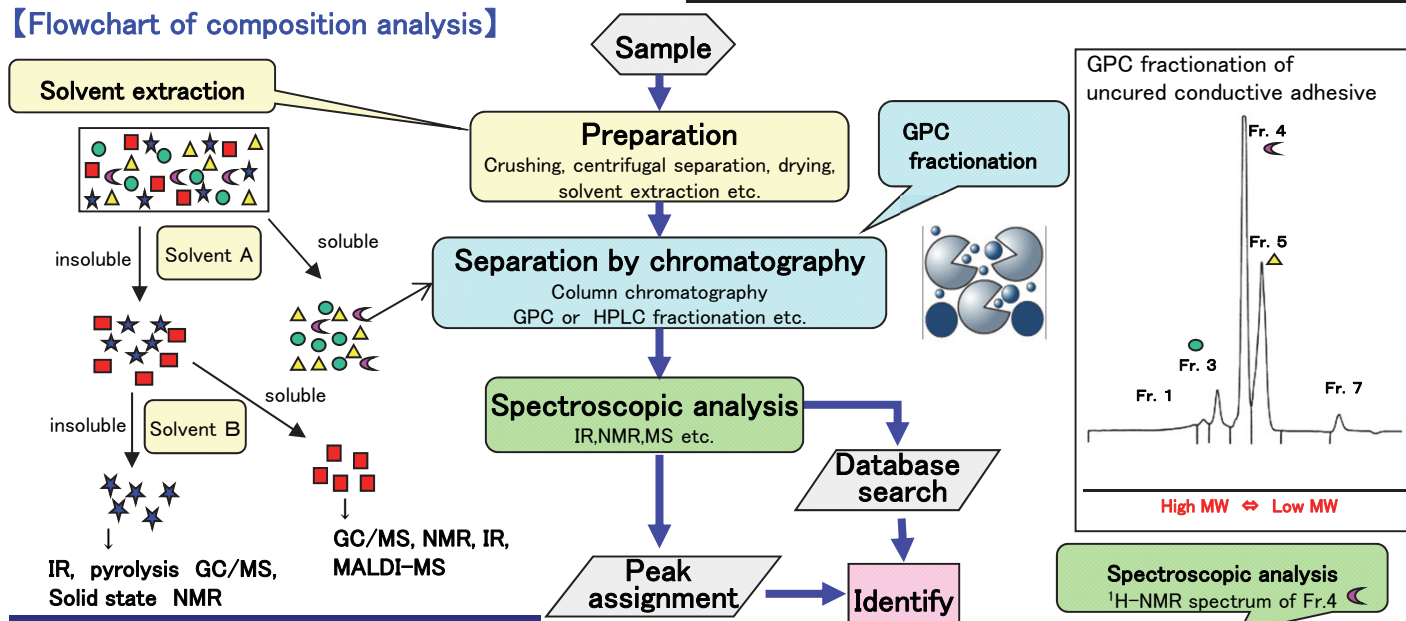
◎ Sample information required for analysis

The applicable procedure is depending on the sample information, such as solubility to a solvent and sample amount.

<Appropriate analysis techniques>

	Amount of sample	
	Large : ~g	Small : ~mg (μg)
Soluble	Solvent extraction, Fractionation, IR, NMR, MALDI-MS, GC/MS, pyrolysis GC/MS etc.	μ-IR, NMR, μ-MS, EPMA, GC/MS, LC/MS, pyrolysis GC/MS etc.
Insoluble	IR, pyrolysis GC/MS, solid state NMR, Chemolysis	μ-IR, Raman, EPMA, pyrolysis GC/MS

【Flowchart of composition analysis】



Examples of analytical results

Main component

Type of polymer
 •Epoxy •Polyimide
 •Phenol resin •Polyester
 Monomer composition

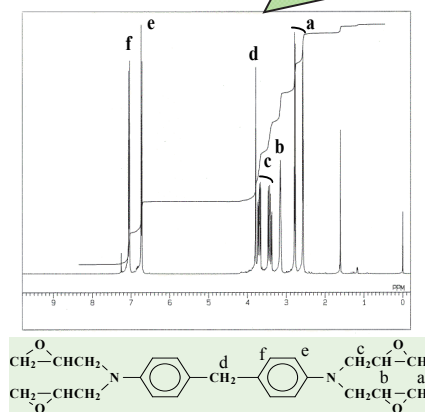
Additives

•Plasticizer •Dispersant
 •Filler •Hardener •Antistat
 •UV absorbent •Anti-oxidant
 •Surface active agent

Toray Research center shall provide advanced services for identifying unknown components by our sophisticated analytical skills and abundant experiences.

Sample	Composition
Conductive adhesive	Bisphenol A type 60 %, Hardener (Imidazol type) 10 %, Ni powder (gold plating) 25 %, Silica 5 %
UV curable resin	Dipentaerythritol hexaacrylate and oligomers 37 %, Pentaerythritol tetraacrylate 10 %, Isobornyl acrylate 10 %, Initiator : Irgacure 907® 3%, Solvent : PGMEA 40 %
Water-based ink	Isopropanol 3 %, Butyl carbitol 4 %, Glycerol 5 %, NMP 5 %, Urea 3 %, Dyes (2 compounds) 4 %, Surface active agent (Acetylenol type) 1 %, water, pH regulator, Fungicide
Plating solution	CuSO ₄ 20 %, H ₂ SO ₄ 5 %, Polyethylene glycol 0.02 %, Bis-3-sulfopropyl disulfide (SPS) 10ppm, water
Urethane rubber	IPDI/PPG/BD copolymer 98 %, UV absorbent : Tinuvin326® 1 %, Antioxidant : Irganox1076® 1 %

Detection limit (in general): 0.1 ~ 1 %



GPC is an effective technique for isolating additives, oligomers, polymers. In this case, isolated compound of Fr.4 was identified by using IR, NMR and MALDI-MS. Concentration of each component is estimated from the weight of GPC fraction.