

## Advanced polymer synthesis and catalytic systems

Chapter		Contents
One	Polymeric catalytic systems	Road map of iran's catalyst production Definition, application, operation, structure, main players of catalyst industry, strategic importance, petrochemical processes, polymeric and non-polymeric catalysts in iran, production processes of catalyst
Two	Catalysis	Definition, catalytic cycle, elements of cycle.
Three	Polyethylene and polypropylene	Polyethylene, applications, structure, morphology, characteristics, development history Polypropylene, types, applications, structural order, crystalline types, spherulites, copolymer structure, physical structure of PP particles, effective factors on morphology, REPLICATION, chemical and thermodynamic properties.
Four	Polymerization by Ziegler-Natta catalysts	Ziegler-Natta catalytic system, catalyst, support, internal and external electron donor, cocatalyst, supported catalyst, catalyst generations (1 <sup>st</sup> , 2 <sup>nd</sup> , 3 <sup>rd</sup> , 4 <sup>th</sup> , 5 <sup>th</sup> , 5 <sup>th</sup> , 7 <sup>th</sup> , 8 <sup>th</sup> ), active sites, RGT context, chain transfer agent, catalyst evaluation, reaction mechanisms, copolymerization, slurry polymerization, polymerization in dilute conditions, suspension homopolymerization, polymerization processes, polymerization kinetics, non-supported catalysts, polypropylene supported catalysts, particle morphology, Morphology on early stages of polymerization, reaction scales, monomer absorption, catalyst breakage, main factors in catalyst breakage and forming final morphology, layer by layer breakage, spontaneous breakage, effect of internal voids on breakage type, effect of support type, distribution of active sites on support, replication phenomenon, particle growth mechanism, multigrain nature of particles, morphology changes, morphology growth models, solid core, polymer flow, multigrain Prepolymerization, controlled breakage, homogeneous activation of catalyst.
Five	UV polymerization	Coating technology, UV technology and applications, advantages and disadvantages
Six	UV curing process	UV curing processes
Seven	free radical initiators and initiation mechanisms	Photochemistry, photoinitiators, types, homogeneous breakage, oxygen inhibition, free radical systems, unsaturated polyester I styrene, polyene /thiol, acrylate compounds, diluents, epoxy-multifunctional acrylates, urethane and oligomeric acrylate oils, urethane acrylates, ...
Eight	Cationic initiators and initiation mechanisms	Onium salts, diazonium salts and lewis acids, sulfonium and iodonium salts, Bronsted acids, organometallic compounds, photosensitization, cationic epoxide cycloaliphatic systems, active diluents, polymerization mechanisms, polyols, effect of water, humidity and temperature, effect of excess thermal energy, acrylated oils, pigmentation, formulation
Nine	Dual cure mechanisms	Free radical I cationic systems, radiation I thermal cure, dual cure of polyurethane / thermal, thermal cure I epoxide, radiation I radiation cure, radiation, air cure.