

Q1: Why are promoters used in catalysis?

A1: Promoters is an additive which has no catalytic properties of its own but enhances the activity of a catalyst. Promoter results in increase of available surface area stabilization against crystal growth and sintering and improvement of mechanical strength.

Q2: what are the carrier or support used and why they are used with catalyst?

A2: A catalyst support is the material, usually a solid with a high surface area, to which a catalyst is affixed. The reactivity of heterogeneous catalysts and nanomaterial-based catalysts occurs at the surface atoms. Catalyst support results in highly porous nature - increase of available surface area improve stability improves the heat transfer characteristics. Some of Alumina, Asbestos, Carborundum, Iron oxide, Manganese, Activated carbon, Zinc oxide.

Q3: What is sol gel method of preparation of catalyst?

A3: The sol-gel process is a wet-chemical technique (Chemical Solution Deposition) for the fabrication of materials starting from a chemical solution that reacts to produce colloidal particles (*sol*). Typical precursors are metal alkoxides and metal chlorides, which undergo hydrolysis and polycondensation reactions to form a colloid, a system composed of solid particles (size ranging from 1 nm to 1 μm) dispersed in a solvent. The sol evolves then towards the formation of an inorganic network containing a liquid phase (*gel*). Formation of a metal oxide involves connecting the metal centers with oxo (M-O-M) or hydroxo (M-OH-M) bridges, therefore generating metal-oxo or metal-hydroxo polymers in solution. The drying process serves to remove the liquid phase from the gel thus forming a porous material, then a thermal treatment (firing) may be performed in order to favor further polycondensation and enhance mechanical properties.

Q4: What is co-precipitation method of preparation of catalyst?

A4: Catalyst based on more than one component can be prepared by co-precipitation. According to IUPAC nomenclature this term is used for the simultaneous precipitation of normal soluble component with macro component from the same solution by the formation of mixed crystal by adsorption, occlusion or by mechanical entrapment. Co-precipitation is very suitable for the generation of homogeneous distribution of catalyst or for the creation of precursor of definite stoichiometry which can be easily converted into active catalyst.

Q5: What is incipient wetness method of preparation of catalyst?

A5: Incipient wetness impregnation is a commonly used technique for the synthesis of heterogeneous catalysts. Typically, the active metal precursor is dissolved in an aqueous or organic solution. Then the metal-containing solution is added to a catalyst support containing the same pore volume as the volume of solution that was added. Capillary action draws the solution into the pores. The catalyst can then be dried and calcined to drive off the volatile components within the solution, depositing the metal on the catalyst surface

Q6: What are the main interactions that can occur between metals and support materials?

A6: Electronic interactions; reduced support species on the metal surface; phase formation at interfacial surfaces.

Q7: Which catalyst properties can be influenced by promoters?

A7: Activity, selectivity, and stability.

Q8: a) Why do monolith and honeycomb catalysts have to be coated before they are loaded with catalyst?
b) What is this initial coating called?

A8: a) Because they have smooth, nonporous surfaces.
b) Washcoat.

