



# **SNS COLLEGE OF TECHNOLOGY**

Vazhiampalayam, Coimbatore-35

**(An Autonomous institution)**

Accredited by **NBA-AICTE** and Re-Accredited by **NAAC-UGC with A+ Grade**

Approved by **AICTE**, New Delhi & Affiliated to **Anna University**, Chennai



## **DEPARTMENT OF CHEMISTRY**

**COURSE NAME : 19CHB102- ENGINEERING CHEMISTRY  
FOR ELECTRICAL SCIENCES**

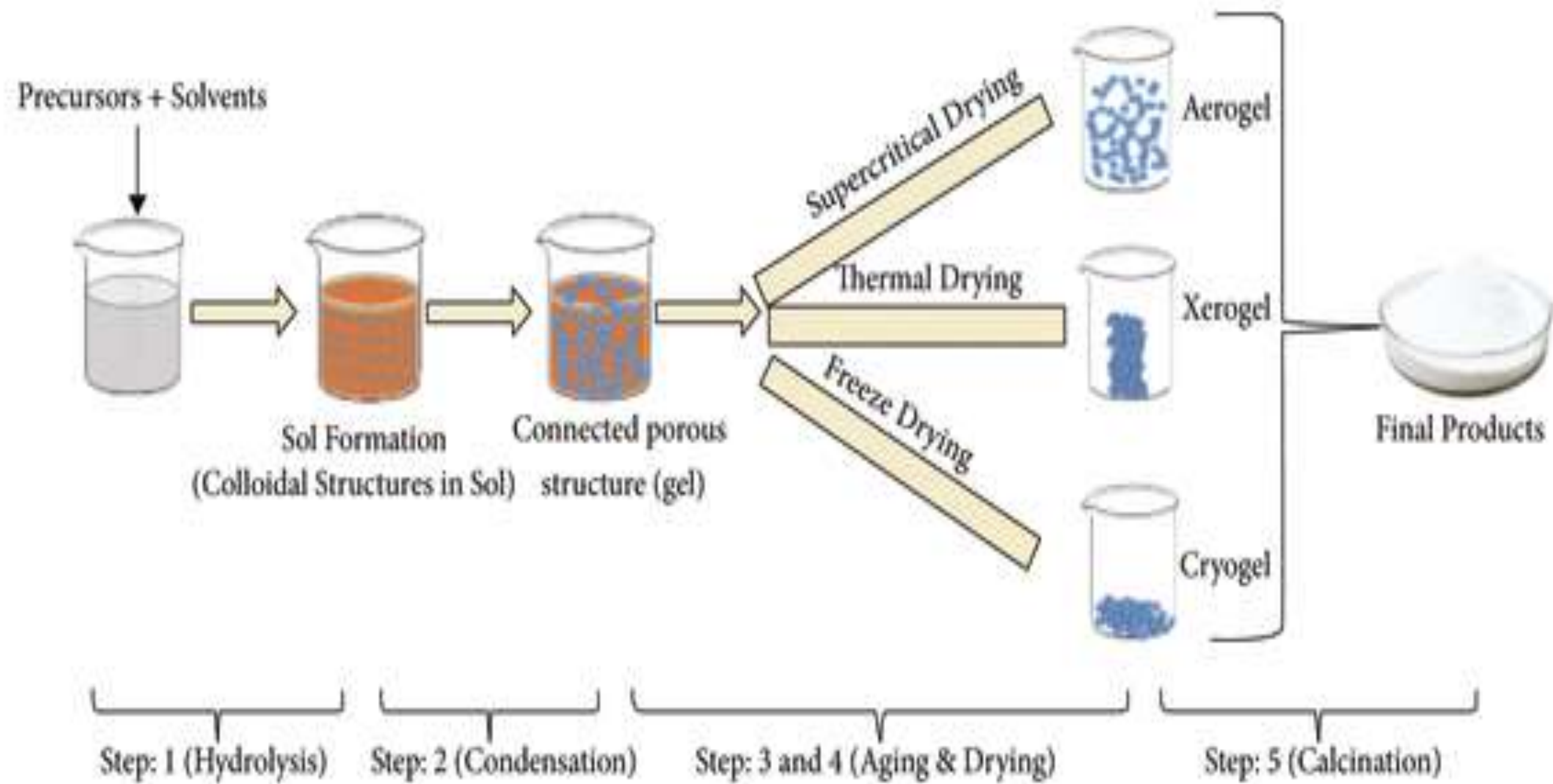
**I YEAR / II SEMESTER**

**UNIT : 3. NANOCHEMISTRY**

**TOPIC : 4 WET CHEMICAL METHOD**

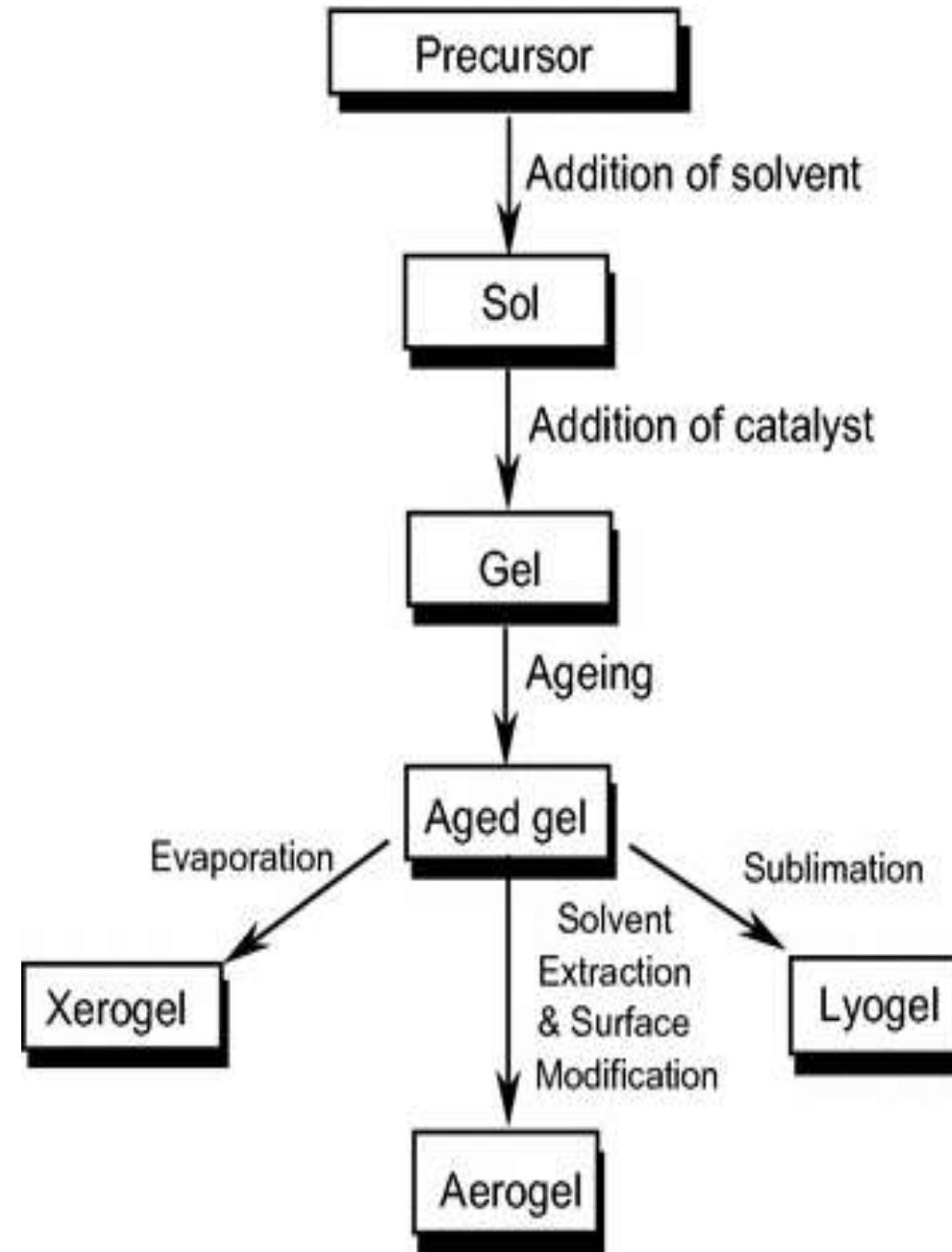


# PROCESS





# PROCESS





- Sol-gel is a chemical solution process used to make ceramic and glass materials in the form of thin films, fibers or powders .
- A sol is (a colloidal or molecular suspension) obtained from (starting materials) .
- A gel is a semi-rigid mass that forms when the solvent from the sol begins to evaporate and the particles or ions left behind begin to join together in a continuous network



- The sol-gel process is a wet-chemical technique that uses either a chemical solution (sol short for solution) or colloidal particles (sol for nanoscale particle) to produce an integrated network (gel).
- Metal alkoxides and metal chlorides are typical precursors. They undergo hydrolysis and polycondensation reactions to form a colloid, a system composed of nanoparticles dispersed in a solvent. The sol evolves then towards the formation of an inorganic continuous network containing a liquid phase (gel)

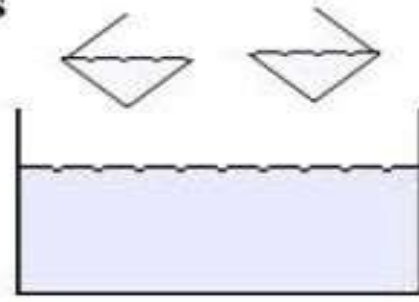


- Formation of a metal oxide involves connecting the metal centers with oxo (M-O-M) or hydroxo (M-OH-M) bridges, therefore generating **metal-oxo or metal-hydroxo polymers** in solution.
- After a drying process, the liquid phase is removed from the gel. Then, a thermal treatment (**calcination**) may be performed in order to favor further poly condensation and enhance mechanical properties



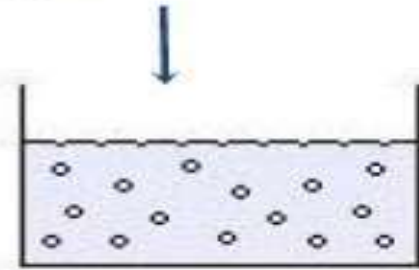
# REACTIONS

Mix reactives



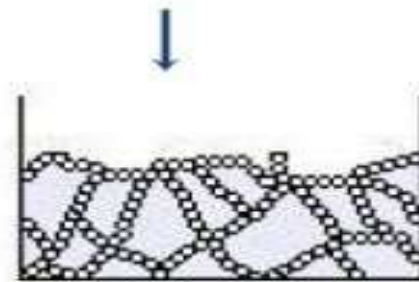
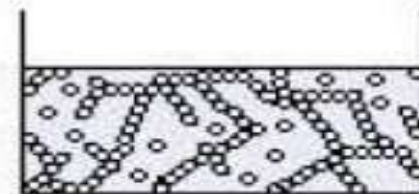
Hydrolysis and Condensation reactions take place

Sol



Gelification

Gel



Hydrolysis

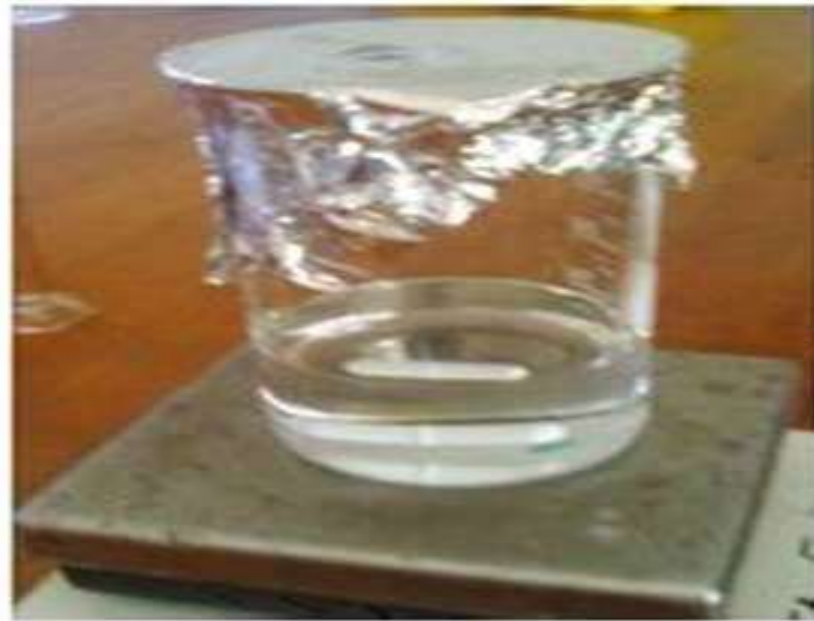


Condensation





# PICTORIAL REPRESENTATION OF PROCESS



**Sol**



**Gel**



**Dried  
gels**



**Sifting**



**Grinding**





# REFERENCES



1. Dr.V.Veeraiyan, “Engineering Chemistry-II ”VRB Pub. Co. Ltd, Chennai.2016..
2. Wiley, “Engineering Chemistry”, John Wiley & Sons. InC, USA.
3. P.C.Jain & Monicka Jain, “Engineering Chemistry” , Dhanapat Rai Publising Company Pvt. Ltd. 2017.

**THANK YOU**