Solvo thermal synthesis

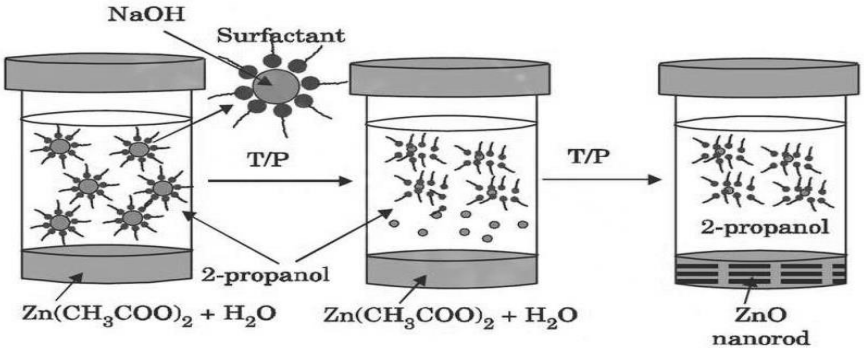
- Solvo thermal synthesis involves the use of solvent under high temperature (between 100°C to 1000°C) and moderate to high pressure (1 atm to 10,000 atm)that facilitate the interaction of precursors during synthesis.

Method

- A solvent like ethanol, methanol, 2-propanol is mixed with certain metal precursors and the solution mixture is placed in an autoclave kept at relativelyhigh temperature and pressure in an oven to carry out the crystal growth.
- The pressure generated in the vessel, due to the solvent vapour, elevates theboiling point of the solvent. Example: Solvo thermal synthesis of zinc oxide nanoparticles

Solvo thermal synthesis of zinc oxide nanoparticles

- Zinc acetate dehydrate is dissolved in 2- propanol at 50°C.
- Subsequently, the solution is cooled to 0°C and NaOH is added to precipitateZnO.
- The solution is then heated to 65C to allow to ZnO growth for some period oftime.
- Then a capping agent (1-dodecanethiol) is injected into the suspension to arrest the growth.
- The rod shaped ZnO nano-crystal is obtained.



Advantages

- Easy and precise control over size and shape of nanomaterials by adjusting the reaction parameters

Disadvantages

- **Safety usage of autoclaves**