



Solvothermal synthesis

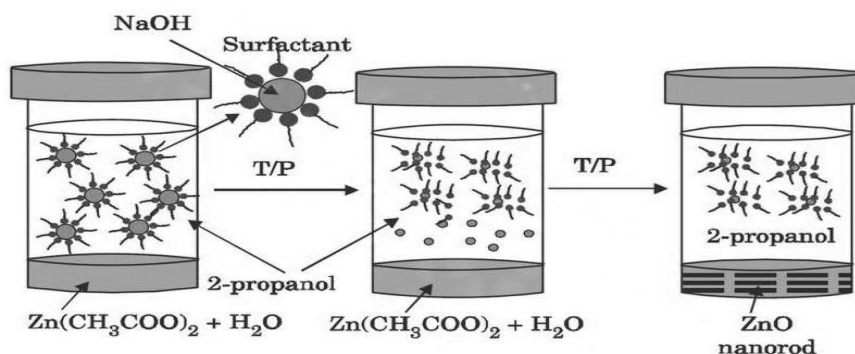
- Solvothermal synthesis involves the use of solvent under high temperature (between 100°C to 1000°C) and moderate to high pressure (1 atm to 10,000 atm) that facilitate the interaction of precursors during synthesis.

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 relatively high temperature and pressure in an oven to carry out the crystal growth.
- The pressure generated in the vessel, due to the solvent vapour, elevates the boiling point of the solvent. Example: Solvothermal synthesis of zinc oxide nanoparticles

Solvothermal 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 precipitate ZnO.
- The solution is then heated to 65°C to allow ZnO growth for some period of time.
- 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