**Synthesis and assembly of nanostructures in flow.**

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**Highlights**

* Continuous flow synthesis of nanocrystalline materials.
* Effect of reaction conditions on growth and crystal structure.
* Sequential growth of core-shell and modified nanoparticles.

**Abstract**

Continuous flow systems are shown to have advantages in synthesis and assembly of nanomaterials, including faceted metal nanoparticles, quantum dots, and nanodendrites. Synthesis in flow leads to sharper size distribution and faster growth than typically achieved in batch processes. The choice of reactor configuration, solvents, reagents, and exposure environment has significant impact on the resulting nanostructures. Chaining multiple flow systems provides control of nucleation, growth, ageing, and over-coating of core-shell nanoparticles, as exemplified with the synthesis of InP quantum dots. Sequential flow synthesis steps also enable synthesis of hierarchically structured nano and meso scale structures.