

Preparation of Calcium Oxide nanoparticles through Thermal Decomposition Method

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Calcium oxide (CaO) is an important inorganic compound which is used in a wide range of applications, it has drawn a tremendous interest in many practical fields including, catalyst, toxic-waste remediation agent, or as an additive in refractory and paint. Lately, calcium oxide has been regarded as one of the most promising candidates for carbon capture in the last decade due to its high capturing efficiency, low running cost, and abundance in the natural world. However, the main drawback of this category of sorbents (CaO) is the rapid decay of the CO₂ uptake capacity during the cycles of carbonation and decarbonation reactions. Several different methods can be used for the preparation of CaO nanoparticles, the physical and chemical properties of CaO can be changed in nanoscale. Morphology, surface area and particles size can be carefully controlled under specific synthesis conditions, and positively affected the reactivity of the sorbent.

In this research work, CaO nanoparticles were prepared using thermal decomposition technique, CaCl₂ and NaOH were used as starting raw materials, the structure and microstructure of the prepared CaO powder were examined using several characterization techniques including, X-ray diffraction (XRD), Scanning electron microscope (SEM) and energy dispersive spectroscopy (EDS), using raw materials with low concentration lead to formation of CaO powder with lower particles size.