ABSTRACT

Conventional Heating method and Hydrothermal Method were used for the synthesis of CaO and CaO/MgO nanoparticles under solvent control conditions. $Ca(NO_3)_2$ and $Mg(NO_3)_2$ were used as precursors, amyl alcohol as surface directing agent and NaOH as source of OH^-. Different samples of CaO were prepared by conventional heating method in order to investigate the effect of calcination temperature and stirring time of reaction. Similarly two different kinds of sets of CaO as well as of CaO/MgO were synthesized under hydrothermal conditions for the investigation of effect of solvent and temperature on particle size i.e effect of temperature in the hydrothermal bomb by keeping all other parameters constant and variation of concentrations of amyl alcohol keeping all other parameters constant. Characterizations of these samples were carried out by Powder X-ray Diffractions (XRD), Thermo Gravimetric Analysis (TGA), Scanning Electron Microscope (SEM) and Fourier Transformed Infrared spectroscopy (FTIR).The synthesized samples (CaO & CaO/MgO) were used to degrade methylene blue under UV-Visible conditions, which is an organic pollutant of waste from industries and is causing serious health problems. Pseudo first order data for degradation for methylene blue at $\lambda_{max=}$ 665 nm was used to quantify the degradation. The data shows that higher the value of "k" greater will be the rate of degradation. Effect of solvent was found prominent in case of CaO samples at higher temperature but in case of CaO/MgO composite systems effect of solvent on particle size was not pronounced. Similarly effect of temperature variation was also pronounced on particle size as indicated by value of "k".