Synthesis and Characterization of Portland Cement

Portland cement is dehydrated limestone mixed with gypsum (calcium sulfate), which inhibits hydration from instantaneous reaction to about five hours. This becomes a problem when the cement ‘sets’ right in the truck and ruins the truck's mixing drum. At the same time, if cement were to be poured or applied, it takes another roughly another five hours for it to set. Hydration of Portland cement was found to be susceptible to being delayed for up to about ten hours up to twenty-two hours through surface modifications using various combinations of certain compounds. However, this also poses a problem on when the cement can be useful because it forces it users to wait for the duration of the delay. With that, this project aims to determine ways of the 'reactivate' the hydration process of Portland cement when desired. This is significant because it allows construction companies to reduce the waste of unused hardened cement and to transport cement without worrying about its 'lifespan' inside a truck. Lastly, this benefits companies financially as they will lessen the maintenance needed for trucks and the cost of materials used.