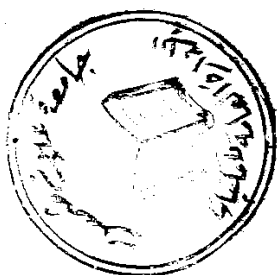
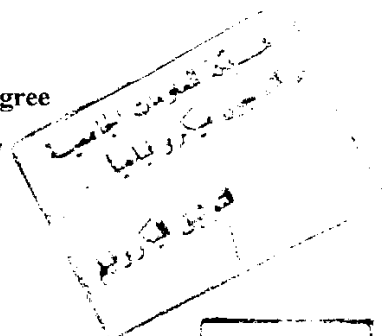


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Department of Chemistry

**PHYSICOCHEMICAL AND MECHANICAL PROPERTIES OF
PORTLAND CEMENT PASTES CONTAINING SILICA
FUMES**

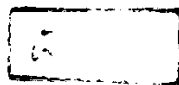


A Thesis submitted for
The Requirement of the Degree
of Doctor of Philosophy
In Chemistry



By

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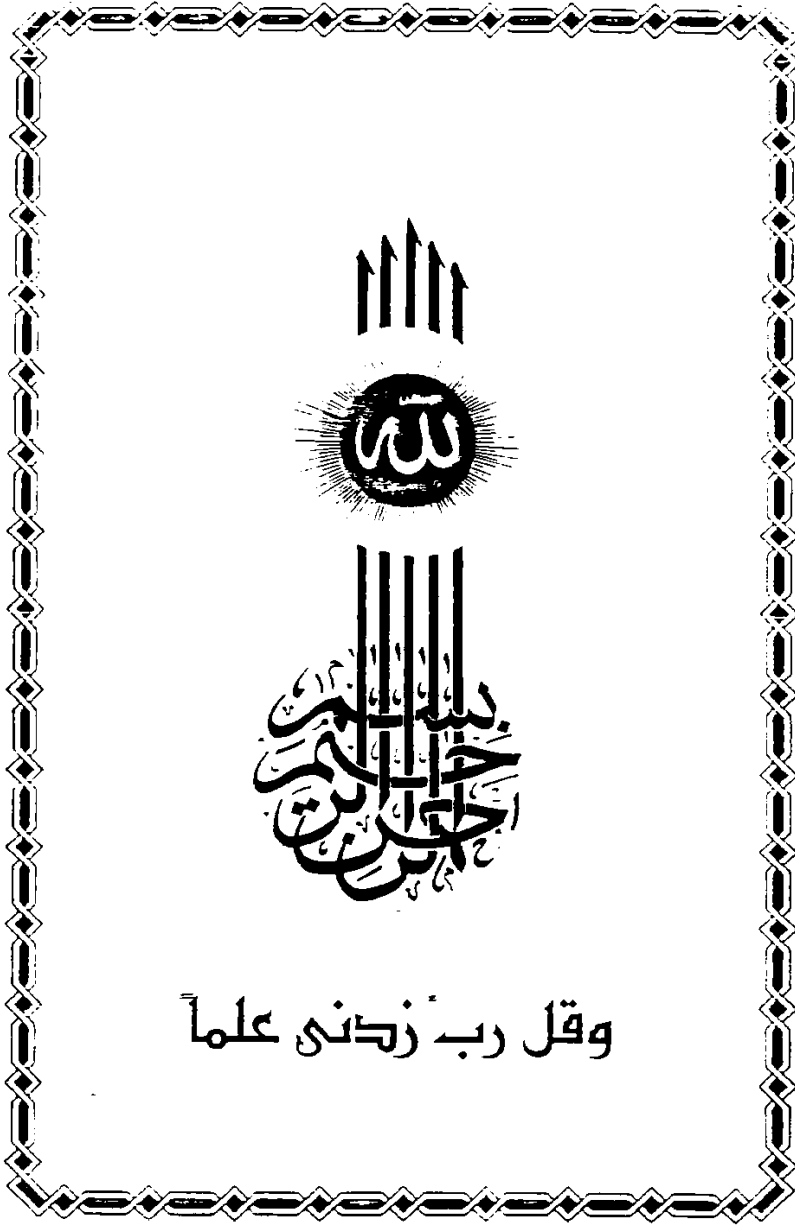
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ABSTRACT

Two hydration reactions were studied; these are: (i) Portland cement-silica fume hydration reaction at room temperature (under normal curing conditions), and (ii) Autoclaved Portland cement clinker-silica fume hydration reaction (under hydrothermal curing conditions). At the end of each hydration period, for the different curing processes, the specimens were tested for compressive strength, hydration kinetics, X-ray diffraction analysis and scanning electron microscopy. The addition of silica fume to Portland cement causes a slight modification in the values of the compressive strength for pastes made with water/solid ratio of 0.40 hydrated at room temperature. Also the results of compressive strength of autoclaved Portland cement clinker-silica fume specimens indicated that 15% silica fume represents the maximum addition to Portland cement clinker in order to produce high strength autoclaved building products suitable for specific applications; this represents the optimum composition of autoclaved Portland cement clinker-silica fume building products.

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