

## C618693 : MAJOR NUCLEAR TECHNOLOGY

KEY WORD: NEUTRON TECHNIQUES / CEMENT POWDER / PROMPT GAMMA-RAYS / NEUTRON ACTIVATION

Pantip Ampornrat : Bulk Analysis of Cement Using Neutron Techniques. Thesis Advisor : Assistant Professor Nares Chankow, M.Eng. Associate Professor Tatchai Sumitra, Dr.Eng. Thesis Co-Advisor : 109 pp. ISBN 974-636-849-4

Nondestructive analysis of Al, Si, Ca and Fe in bulk cement powder sample was investigated using neutron techniques i.e. inelastic neutron scattering analysis (INSA), prompt captured gamma-ray neutron activation analysis (PGNAA) and cyclic neutron activation analysis (CNA). Si and Fe were analyzed by the INSA using 90 mCi  $^{241}\text{Am-Be}$  as a fast neutron source. The CNA was used to analyze Al while the PGNAA was used to analyze Ca and Fe. In the CNA and PGNAA thermal neutrons were produced from a water moderated  $5\text{ Ci }^{238}\text{Pu-Be}$  neutron source. All gamma-ray measurements in this research were done by using a 5"x5" NaI(Tl) detector. The detection limits of Al, Si, Ca and Fe were found to be about 1, 10, 20 and 0.5% by weight respectively. Analysis results of cement powder samples from the neutron techniques were in good agreement with those obtained from the XRF method. Further improvement is required before the techniques is actually applied in analyzing the cement powder samples.

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