

## **Elemental analysis of concrete samples using an accelerator-based PGNAA setup**

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**Abstract:** Elemental analysis of concrete samples was carried out using an accelerator-based prompt gamma ray neutron activation analysis (PGNAA) setup. The gamma rays were produced via the capture of thermal neutron in the concrete sample. The prompt gamma ray yield was measured for 12 cm long concrete samples as a function of sample radius over a range of 6-11.5 cm radii. The optimum yield of the prompt gamma rays from the concrete sample was measured from a sample with 11.5 cm radius. The gamma ray yield was also calculated for 12 cm long concrete samples with 6-11.5 cm radius using Monte Carlo simulations. The experimental results were in excellent agreement with the calculated yield of the prompt gamma rays from the samples. Result of this study has shown the useful application of an accelerator-based PGNAA setup in elemental analysis of concrete sample. The facility can be further used to determine the chloride and sulfate concentrations in concrete samples for corrosion studies of reinforcement steel in concrete structures. 2004 © Elsevier B.V. All rights reserved.