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## **Development of XRF Application for Composition Determination of Clay-based Materials**

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An easy-to-use and robust analytical method was developed and validated for accurate composition determination of clay based powder material by x-ray fluorescence.

The method is applicable to the composition determination of Na<sub>2</sub>O, MgO, K<sub>2</sub>O, CaO, TiO<sub>2</sub>, Fe<sub>2</sub>O<sub>3</sub>, Al<sub>2</sub>O<sub>3</sub> and SiO<sub>2</sub> with a wide concentration range. Powder sample is fused into a glass bead for x-ray fluorescence analysis. The concentrations of the oxides are determined by analysis against a calibration using the fundamental parameter method and a set of matrix-matched standards prepared from pure chemicals. The oxide concentrations in the standards were calculated from loss on drying and mass balance data to enable accurate determinations.

Accuracy was determined by analysis of eight NIST reference standards materials (RSM) via percent recovery calculation. The method was found to have good accuracy, precision, and quantitation limits with analysis measurement times of ~ 5 min after instrument calibration (plus ~ 45 min for sample preparation in a fusion furnace).

The application was set up in a “push button – get result” manner which does not need any judgment or action from the operator. It is routinely used in QC lab by technician with little XRF experience.