

S4 EXPLORER

ANALYSIS OF RAW MIX SAMPLES (CEMENT INDUSTRY)

Introduction

This lab report will describe the procedures and results of a calibration with raw mix samples prepared as fused beads and pressed pellets.

Preparation

A set of six certified reference materials (Holderbank) was prepared in two different ways:

- as fused beads with 0.9 g of ignited sample material and 8.1 g of flux ($\text{Li}_2\text{B}_4\text{O}_7$)
- as pressed pellets with 20% of wax

Calibration

Compounds, concentration ranges and standard deviations of the calibration as well as sensitivities and lower limits of detection are given for both preparation methods (table 1).

Results

The table clearly shows that sensitivities and lower limits of detection are better for pressed pellets, whereas the accuracy of the calibration is much better for fused beads.



Table 1: Analysis of raw mix samples using an S4 EXPLORER

Compound	Concentration Range %	Preparation	Calibration Std Dev %	Sensitivity Kcps / %	LLD 100s, 3s ppm
Na₂O	0.04 - 0.6	Fused Bead	0.03	0.9	70
		Pressed Pellet	0.03	6	14
MgO	0.5 - 2.1	Fused Bead	0.02	1.7	30
		Pressed Pellet	0.15	7.2	12
Al₂O₃	2.0 - 3.7	Fused Bead	0.04	1.6	17
		Pressed Pellet	0.1	8.7	5
SiO₂	12 - 17	Fused Bead	0.2	2.3	-
		Pressed Pellet	2	9.2	-
P₂O₅	0.03 - 0.2	Fused Bead	0.002	1.7	15
		Pressed Pellet	0.006	6.1	5
K₂O	0.02 - 1	Fused Bead	0.04	6.3	9
		Pressed Pellet	0.05	28	3
CaO	41 - 47	Fused Bead	0.3	7.3	-
		Pressed Pellet	1.2	22	
TiO₂	0.10 - 0.21	Fused Bead	0.005	7.1	7
		Pressed Pellet	0.007	11	5
Mn₂O₃	0.02 - 0.10	Fused Bead	0.001	13	8
		Pressed Pellet	0.001	20	4
Fe₂O₃	0.43 - 2.8	Fused Bead	0.02	26	7
		Pressed Pellet	0.03	45	2

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