Application Note EDXRF1187

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EDXRF1187 - Analysis of titanium and iron in kaolin clay

Scope

The analysis of titanium (Ti) and iron (Fe) in kaolin clay is demonstrated.

Background

Kaolin clay has many uses, including pottery and ceramics, coated paper, and as an additive in toothpastes and cosmetics. The titanium and iron present affects the color and physical properties of the clay, and must be closely monitored throughout QA/QC processes to ensure proper ratios for each given product type. A fast and simple means of measuring titanium and iron is very important, and Rigaku meets this challenge with the NEX QC benchtop EDXRF analyzer.

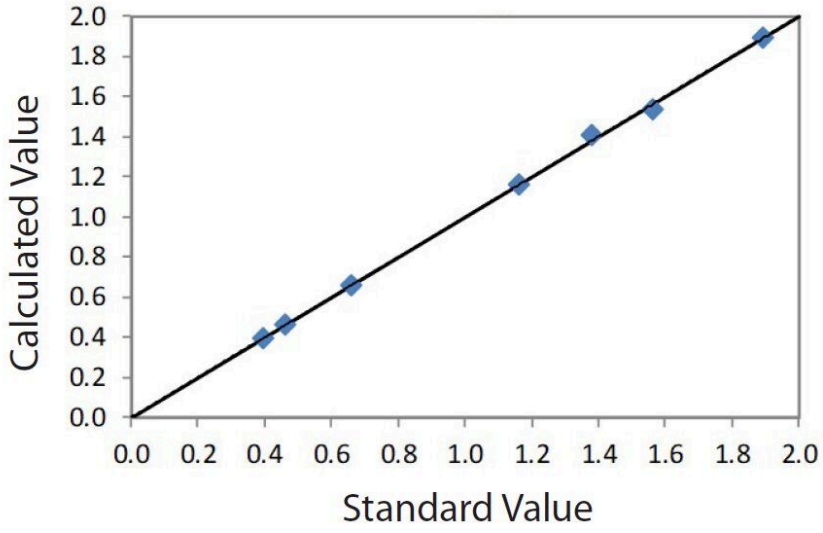
Rugged, simple, and intuitive, NEX QC offers analysts or technicians a fast means of monitoring elemental composition with minimal sample preparation.

Calibration

Seven kaolin clay samples were used to develop empirical calibrations for Ti and Fe. The results of the calibrations are reported below. Note: *The introduction of additional calibration standards, especially in critical analytical ranges (i.e. process targets) may improve analytical accuracy for a given clay product.*

Ti Calibration

Element: Ti Units: %		
Sample I.D.	**Standard value**	**Calculated value**
Standard #1	0.395	0.397
Standard #2	0.46	0.46
Standard #3	0.66	0.66
Standard #4	1.16	1.16
Standard #5	1.38	1.40
Standard #6	1.56	1.53
Standard #7	1.89	1.90

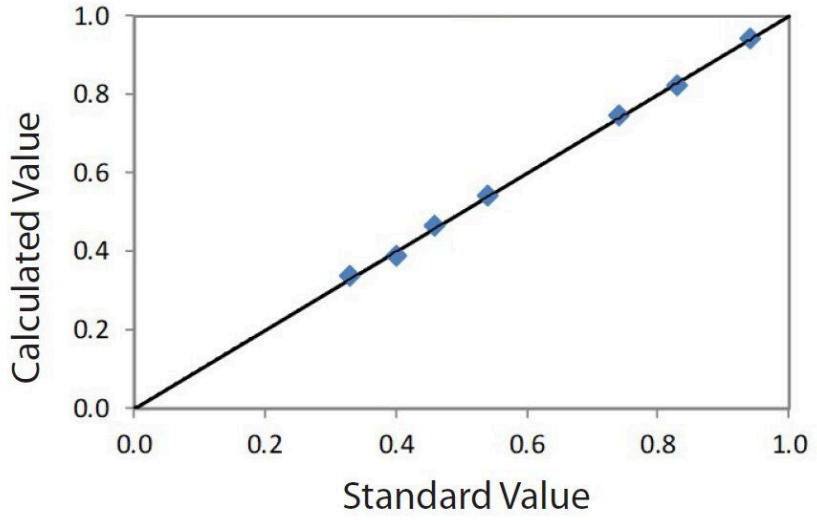


Correlation plot Ti

Fe Calibration

Element: Fe Units: %		
Sample I.D.	**Standard value**	**Calculated value**
Standard #1	0.33	0.34
Standard #2	0.46	0.46
Standard #3	0.74	0.74
Standard #4	0.54	0.54
Standard #5	0.83	0.82
Standard #6	0.94	0.94

Standard #7	0.40	0.39



Correlation plot Fe

Repeatability

To demonstrate repeatability (precision), two typical calibration standards were selected. Each was measured without moving the sample between measurements.

Sample I.D.: Standard #3 **Units: Mass%**			
Element	**Standard value**	**NEX QC value**	**Std. dev (σ)**
Ti	0.66	0.65	0.005
Fe	0.74	0.74	0.007

Sample I.D.: Standard #7 **Units: Mass%**			
Element	**Standard value**	**NEX QC value**	**Std. dev (σ)**
Ti	1.89	1.87	0.011
Fe	0.40	0.39	0.005

Conclusion

The results show NEX QC provides excellent performance for the measurement of titanium and iron in kaolin clay.

The NEX QC offers a simple and fast means of analysis during the QA/QC process in the production of clay-based products, as well as for screening at the quarry.

Related products

NEX QC Series

Combines quality, affordability, and performance for a wide range of applications