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EDXRF1378 - Predicting % Ash Content in Coal



Scope

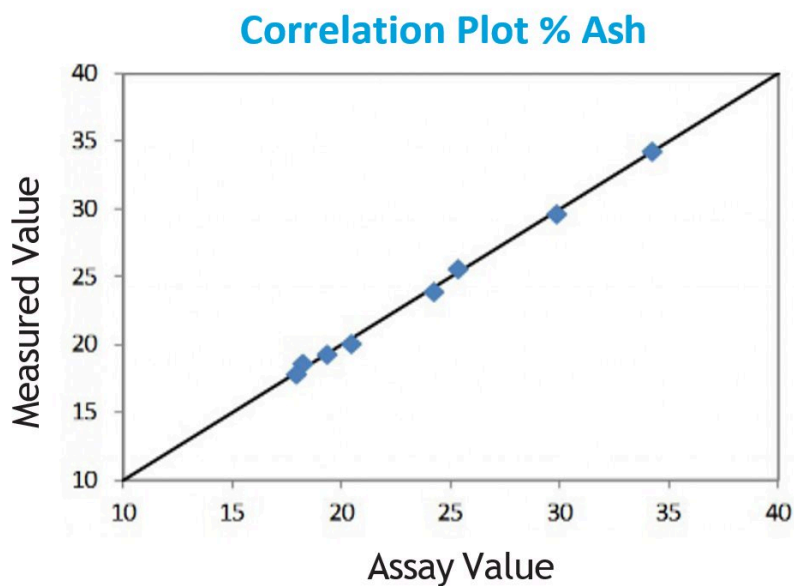
Measurement of predicted ash content in unburned coal is demonstrated here.

Background

Ash consists of the metal oxides and heavier elements that remain after burning removes the organic, gaseous and volatile components. Coal quality and pricing in part depends on the ash content of the coal, and so predicting ash in coal before burning is important in many areas of the industry. EDXRF offers a fast, simple and affordable method of predicting the % ash content in coal before it is burned.

Calibration

To create calibration standards, two homogeneous splits are taken from a homogeneous bulk sample. One split is ashed to determine the % ash content. This % ash number is then assigned to the unburned split as an assay for use as an XRF calibration standard. Separate calibrations may be required for each different coal type of interest, for example, separate calibrations for lignite and bituminous coal.



To demonstrate use at a coal facility, eight calibration standards were collected from the site and were used to build an empirical calibration. % Ash measurements were automatically optimized using matrix corrections for iron, sulfur and silicon.

% Ash		
Standard I.D.	Assay value	Measured value
1	25.3	25.6
2	19.3	19.3
3	18.2	18.6
4	24.2	23.9
5	20.4	20.1
6	29.8	29.7
7	17.9	17.8
8	34.2	34.3

Repeatability

To demonstrate repeatability, four calibration standards were selected that spread across the % ash concentration range. Each was measured without moving the sample between measurements to determine an average value for precision. If desired, repeatability can be enhanced by using consistent 100 – 200 mesh grinding and longer measurement times.

Sample	% Ash assay value	% Ash calibration value	% Ash average value	Std. dev	% Relative dev
7	17.9	17.8	18.0	0.3	1.7

