CLEMEX

Reflectance Characterization

Image Analysis Report **234b**

Sample Description

Two samples of coking quality coal are submitted for analysis. The samples were crushed and molded into a pellet with an epoxy binder.

Purpose of Analysis

Demonstrate the ability of the Clemex image analyzer to produce a cumulative histogram of the gray levels of the entire sample after maximizing the settings to obtain a well-distributed graph for a reliable interpretation.

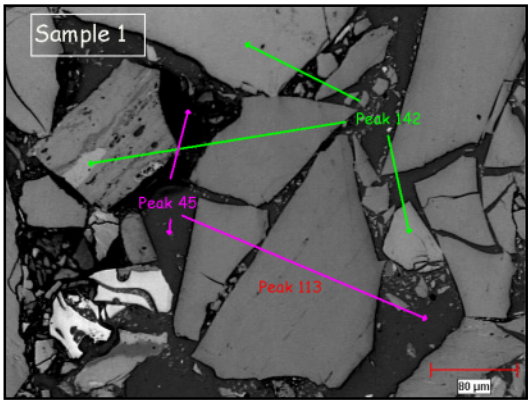

Figure 1: *Typical image (200x – 0.64 µm/pixel).*

Procedure

The original images were analyzed without any gray modifications to ensure a realistic cumulative gray histogram. At 200x, it took a pattern of 27 X 40 (1080) fields to cover the whole surface. The linear focus option was necessary to keep the sample in focus for the entire run. At each filed, the gray levels of all pixels (434720) were cumulated and shown as a histogram. In less than 20 min., a total count of 469497600 pixels is cumulated covering a surface of 193488750 μm^2.

Results Summary

The color camera was set to maximize the spread of the histogram. The gray levels representing porosity were cumulated at the left of the histogram while the gray levels of the epoxy binder appear as the next clear peak. Using standards to define a reliable function that links the reflectance with the gray levels, the identification of the other peaks becomes possible. The histogram already tells us something about the content of the sample and if more information were given it would be possible to determine the composition of the sample directly using the gray levels.

Using image analysis to determine the reflectance of coal samples is possible if the input can be controlled. Among the factors to be controlled are the light source, camera settings and filters, all of which affect one another. The calibration curve must be found using constant settings and the samples must be evaluated accordingly to the curve using the same optimized settings. Results can be produced repeatedly.

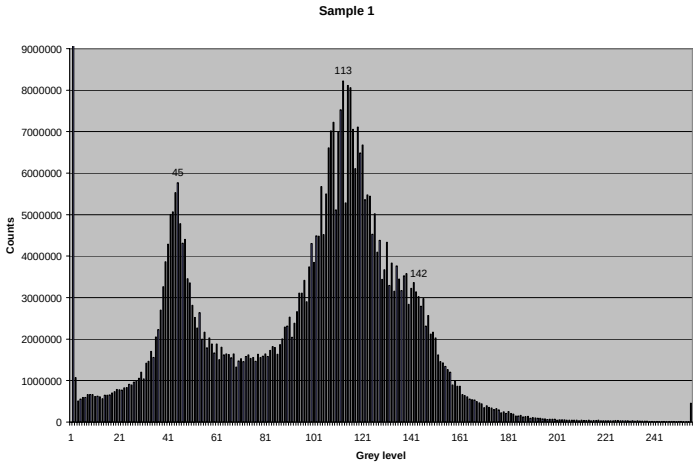

Figure 2**:** *Cumulative gray histogram of sample 1.*

Equipment

Image Analysis System:	Clemex Vision SE
Camera :	Sony 950P
Microscope:	Nikon Epiphot 200
Objective:	Nikon 20x (0.64µm/pixel)
Stage:	Motorized Marzhauser ek8b-s1 with auto focus