
NODULARITY AND FERRITE / PEARLITE ANALYSIS

Sample Description

A polished cast iron sample is submitted for nodularity analysis. The percentage of ferrite to pearlite analysis is also determined after etching the sample.

Purpose of Analysis

Demonstrate the ability of the Clemex Vision image analysis system can apply nodularity analysis and measure the ferrite to pearlite ratio on cast iron.

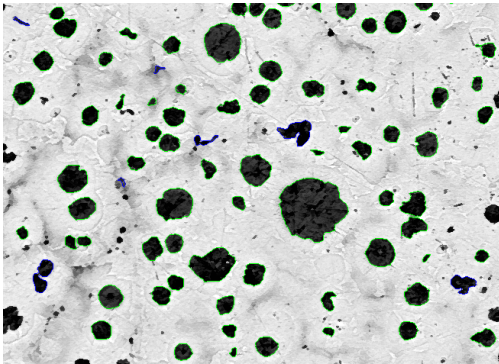


Figure 1: Nodularity analysis.

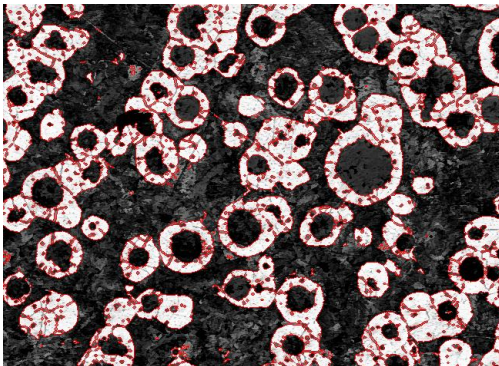


Figure 2: Ferrite / pearlite analysis.

Procedure

The analyses were done at 100X. To determine the nodularity, graphite nodules were binarized and assigned in green bitplane. The spherical (0.65) nodules were outlined in green. The rough nodules were outlined in blue. The sizes of nodules were measured and classified according to ASTM A247 standard. The percentage of ferrite to pearlite was determined on etched sample. Graphite and pearlite matrix present in dark, whereas ferrite appears as light color. The ferrite was outlined in red. Deducting the nodular percentage from the total dark phase percentage gave the pearlite content.

Equipment

Image Analysis System:	Clemex Vision PE
Magnification:	100X
Illumination:	Reflected Light

Results

Measurements were performed on each distinct feature from the field of view. Automated statistics and graphs were generated and would be cumulated if analyzing several images. Final results can be printed directly from Clemex Vision. Raw data are linked to their respective objects for validation purpose. Raw data can also be exported in Excel format allowing to build an automated macro to find the size class. The summary of results is presented below.

Field Area: 429925.62 Sqr mic.
Number of Fields 16
Total Analysis Area: 6878809.96 Sqr mic.
Nodules per sqr mm: 185.50
Nodularity by Count: 91.22 %
Nodularity by Area: 90.39 %

A-247 size distribution

Size Class	Percentage
Over	0.00
1	0.00
2	0.00
3	0.00
4	0.31
5	19.78
6	64.60
7	15.31
8	0.00
Total %:	100.00

	AFS	ECIR	
Nodules percent:	11.33	Not included	%
Pearlite percent:	52.21	59.00	%
Ferrite percent:	36.47	41.00	%
Carbides percent:	0.00	Not included	%
Total percent:	100.00	100.00	%

A-247 Size Distribution
