

Dendritic Arm Spacing Image Analysis Report 264

Sample Description

Two samples of aluminum alloy 357 from two different heats (L61 and L65).

Purpose of Analysis

Demonstrate the ability of the Clemex Vision image analyzer to measure the dendritic arm spacing in the field of view.

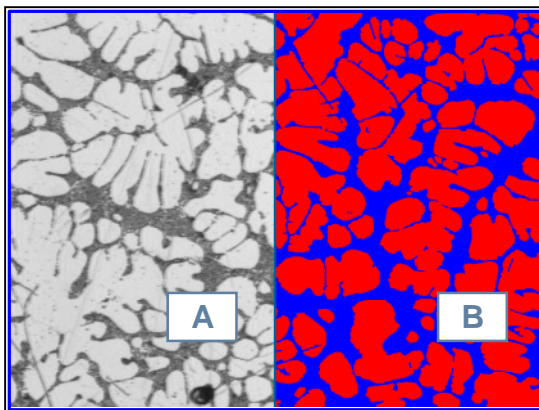


Figure 1: a) Original Image from sample L61 at 200x with a calibration factor of 0.52 $\mu\text{m}/\text{pixel}$. b) The eutectic was binarized into the blue bitplane (Gray Thresholding). The alpha aluminum phase (red) was deduced from the blue bitplane.

Procedure

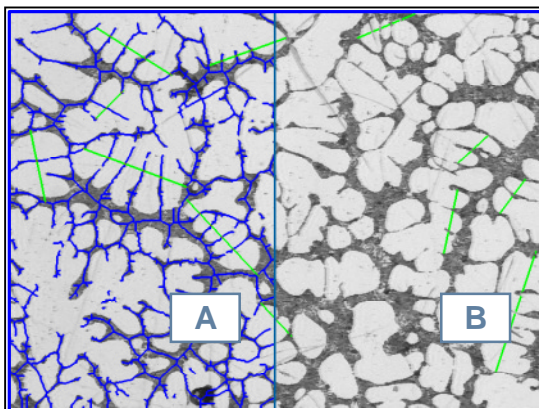


Figure 2: a) The blue bitplane was thinned to obtain the center between cells. A Pause Edit Line allowed the user to draw properly oriented lines (green) over the dendrites. b) The lines were sectioned using the blue bitplane as reference. The green lines represent the cell intervals.

Procedure (continued)

The dendritic arm spacings are best approximated by the dendrite cell intervals (center-to-center distance between two cells). When there is only a small amount of eutectic, the cell intervals are approximately equal to the size of the cells.

Results Summary

Cell Intervals (μm):	L61A	L65A
Minimum	5.8	8.1
Maximum	33.9	37.9
Mean	16.4	17.5
Std Dev.	5.1	5.4

Phase Area (%):	L61A	L65A
Eutectic	33.16	32.67
Alpha Al.	66.84	67.33

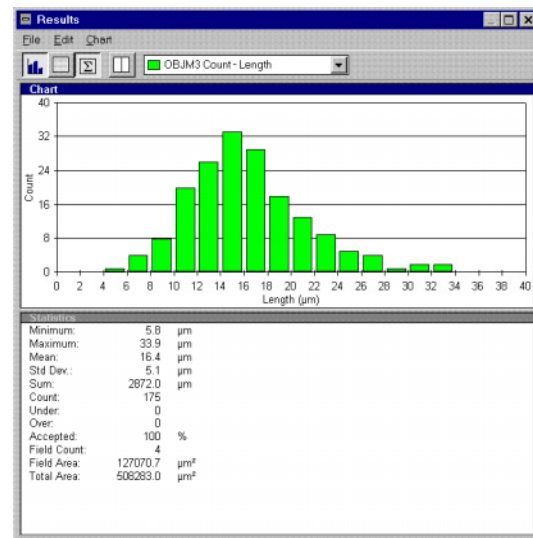


Figure 3: Length distribution of the cell intervals on sample L61.

Polishing scratches can be mistaken for a cell division lowering the mean cell interval. Areas of low contrast could have the reverse effect since the thinnest intercellular phase could remain undetected by the system. Analyzing more fields (4 were analyzed here) could slightly alter the statistics.

Equipment

Image Analysis

System:	Clemex Vision SE
Camera:	Sony XC-77 CE B&W
Microscope:	Nikon Epiphot 200
Objective:	Nikon 20x (Mag.: 200x)
Stage:	Motorized Marzhauser