

DENDRITE ARM SPACING IN ALUMINUM ALLOY

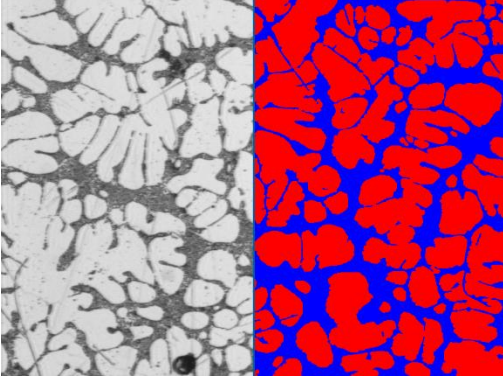


Figure 1a: Original image from sample L61 at 200x with a calibration factor of 0.52 $\mu\text{m}/\text{pixel}$.

Figure 1b: The eutectic is binarized into blue bitplane. The alpha aluminum phase (red) is deduced from the blue bitplane.

Procedure

The dendrite 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.

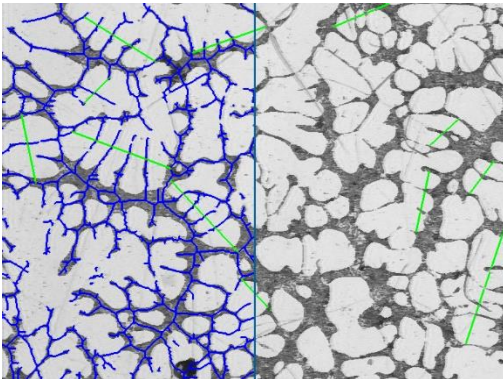


Figure 2a: The blue bitplane is thinned to obtain the center between cells. A Pause Edit Line allows the user to draw properly oriented lines (green) over the dendrites.

Figure 2b: The lines are sectioned using the blue bitplane as reference. The green lines represent the cell intervals.

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 analysis system can measure the dendrite arm spacing in the field of view.

Equipment

Image Analysis System: Clemex Vision PE
Microscope: Nikon Epiphot 200
Camera: Sony XC-77 CE B&W
Magnification: 200X
Stage: Motorized Marzhauser

Results

Well polished surface is essential to minimize the influence of scratches when identifying the cell intervals. Analyzing multiple fields could give more representative results.

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	33.2	32.7
Alpha Al	66.8	67.3

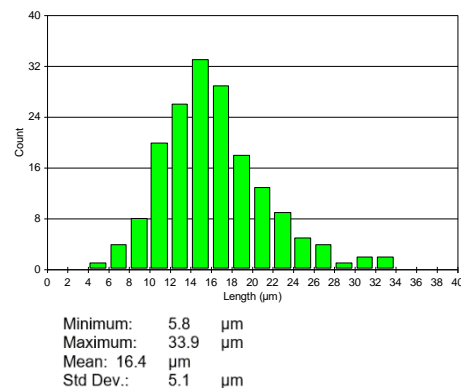


Figure 3: Length distribution of the cell intervals on sample L61.