CHARACTERIZATION OF A THERMAL SPRAY COATING

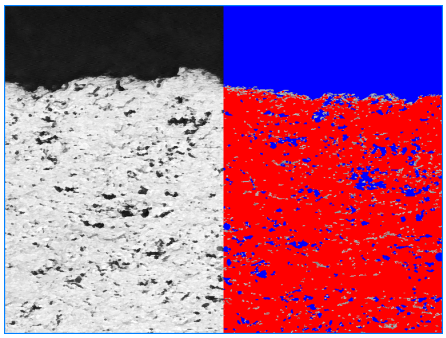

Figure 1a: *Original image.*

Figure 1b: *Binarization by Gray Thresholding. Mount and pores are in blue while coating appears in red.*

Sample Description

One mounted sample of thermal spray coating.

Purpose of Analysis

Demonstrate the ability of the Clemex Vision image analysis system to discriminate and measure the porosity of the coating.

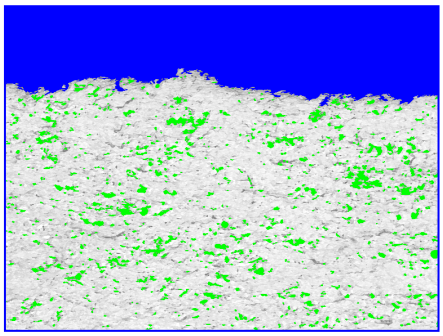

Figure 2: *Pores are isolated from blue bitplane (mount) and transferred into green bitplane.*

Procedure

The Linear Focusing option was used to perform a perfectly leveled analysis. The original image (Figure 1a) was improved by gray transformation. The mount and the pores are binarzed into blue while the substrate and the coating are binarized into red in Figure 1b. Binary operations were used to isolate the substrate by removing the portion of the red bitplane corresponding to the coating. Artifacts are removed from the blue bitplane and pores were isolated and assigned into green bitplane as shown in Figure 2. Figure 3 shows the outline of the 2 bitplanes that represent the coating (red) and the pores (greens) overlaid against the original image.

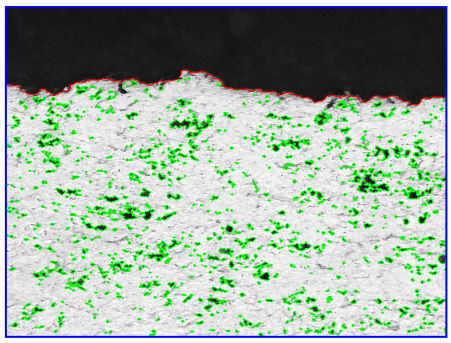

Figure 3: *Green outline of the detected pores and red outline of the coating overlaid against the original image.*

Equipment

Image Analysis System:	Clemex Vision PE
Microscope:	Nikon Epiphot 200
Camera:	Sony XC-77CE B&W
Magnification:	200X
Stage:	Marzhauser EK8B-S1

Results

Figure 5 compares the area percentage of the porosity (green) and the area percentage of the coating without pores (yellow) to the while coating area.

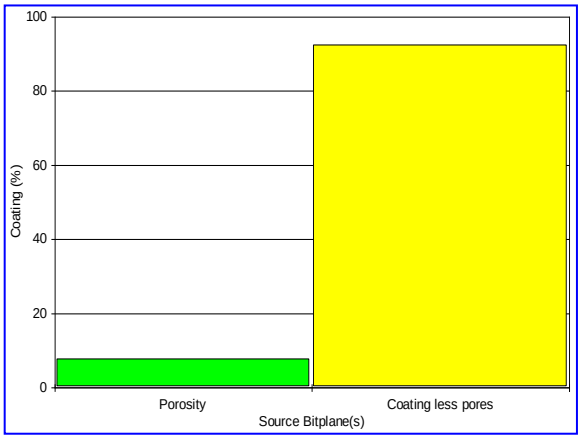

Figure 4: *Porosity area percentage (green) and coating without pore area percentage (yellow) compared to the coating (y axis).*

Pores:	***Area (µm²)***	***Length (µm)***	***Pores / Coating (%)***
Minimum	0.3	0.6	7.74
Maximum	375.3	61.8	
Mean	9.3	4.6	
Standard Deviation	15.6	3.7	