Sphere Roughness Characterization

Image Analysis Report **328**

Sample Description

A image in TIFF format (no calibration) showing large and small gray particles on a gray background. The large particles have a fine structure.

Purpose of Analysis

Demonstrate the ability of the Clemex Vision system to:

1. Find the particle boundaries;
2. Measure the surface fraction of the particles;
3. Find the fine structure within the large particles.

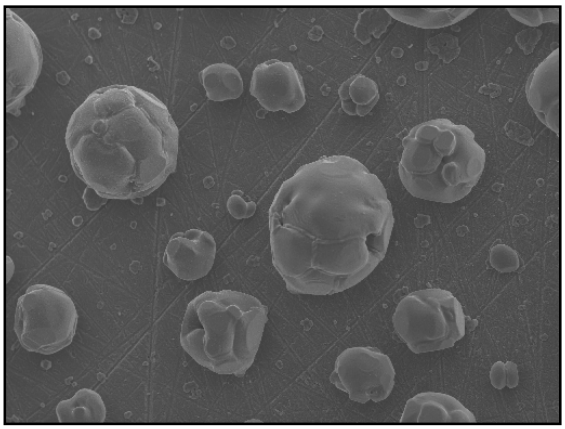

Figure 1: *Original image.*

Procedure

The original image was binarized using *Gray Thresholding.* Binary filters removed artifacts from the bitplane (binary plane).

Gray transformation (*Kirsh*) was used to isolate the fine structure of the particles. A second *Gray Thresholding* was applied to binarize this structure. Incomplete objects were eliminated from bitplanes. The two bitplanes were compared during final measurements.

Procedure (continued)

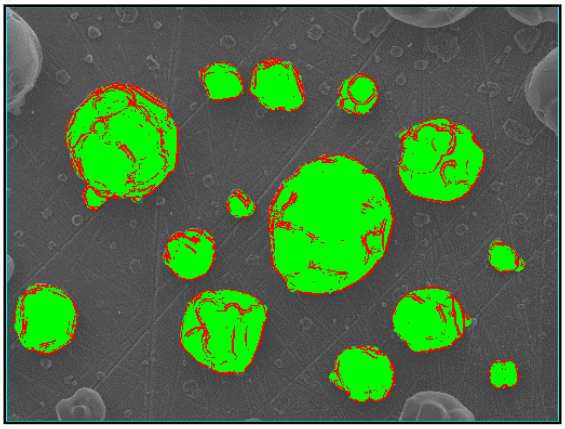

Figure 2*: Detected particles in green bitplane and fine structure in red bitplane overlaid against the original image.*

Results Summary

Image analysis performed on images from electronic microscopes tends to be more complex than other types of analysis. The main reason for this is the shadow effect showing the topography when working with secondary electrons. Moreover, the signal produced by the secondary electrons is often weak and needs to be amplified. Consequently the noise is also increased and has an influence on the final image resolution.

It is important to use a good resolution when capturing the image since it is not possible to improve the resolution on an image that is already captured. Nevertheless, it is possible to improve the contrast, minimize the effect of the noise and apply other gray filters.

Equipment

Image Analysis System:	Clemex Vision SE
Printer :	Digital Colorwriter LSR 2000