Chip Plating Analysis

Image Analysis Report #510

Sample Description

One image showing plated patterns on chip was submitted for analysis.

Purpose of Analysis

Demonstrate that the Clemex Vision image analysis system can distinguish the vertically aligned plating lines and perform width measurements on them.

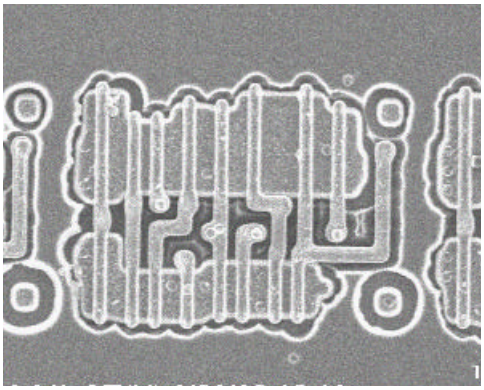


Figure 1: *Part of the original image (SEM - 0.4975 microns/pixel).*

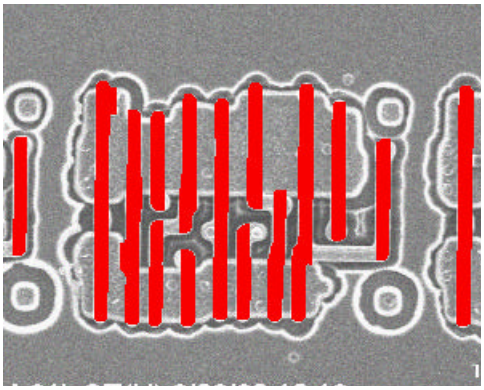


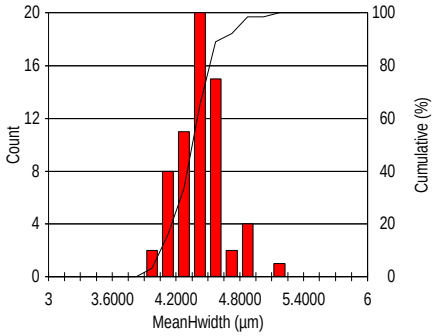
Figure 2: *Detected plated lines as measured into red bitplane.*

Procedure

Gray filters are applied on the original image to fill in the vertical plating lines. By doing so, the binarization step by Gray Thresholding is made possible. The plating is then binarized into the red bitplane. A Top Hat gray filter is applied on the modified gray image to isolate any thin and relatively dark parts of the image. This corresponds to areas between plating lines. The modified image is binarized into the green bitplane which is then removed from the original red bitplane. Another similar cleaning step is performed using the binarized background. The cleaned red bitplane is processed using boolean instructions to isolate vertical parts from the rest of the bitplane.

Results

Width measurements are performed on each feature as well as on each field. Automated statistics and graph are generated and would be cumulated if analyzing several images (sample). Final results can be printed directly from Clemex Vision. Raw data are linked to their respective objects for validation purposes. In the present case, 3 features were eliminated from the statistics at the validation step using Mapping View. Raw data can also be exported in Excel format.



Minimum:	*3.93 microns*
Maximum:	*5.11 microns*
Mean:	*4.42 microns*
Std Dev.:	*0.22 microns*

Figure 3: *Width distribution and corresponding statistics of vertically aligned parts of the plating.*

Equipment

Image Analysis System:	Clemex Vision PE
Calibration:	0.4975 microns/pixel

Discussion

The main difficulty of this analysis was to binarize the plating including the inside part without capturing too much of the background. The problem was partially overcome using gray filters (smooth, closing). Two others binarization steps were then used to complete the binarization.

The sample must be placed such a way to vertically orient the plating lines of interest. When performing a run, the gray levels of the pictures must be stable from field to field since the binarization steps are very sensitive and critical. If it's not possible, the use of Pause Thresholds could be necessary.

Some false features can be detected. Minimizing the quantity of scratches would help to reduce false detections. Final results should be validated using the Mapping View tool to eliminate undesired features. Also, once in a while, a feature may completely disappear. This could be avoided but, several false detections would be present.

Results are reproducible.