

MICROHARDNESS (KNOOP)

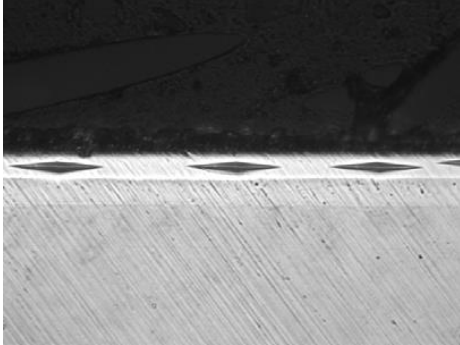


Figure 1: Original image with three of the five Knoop indents.

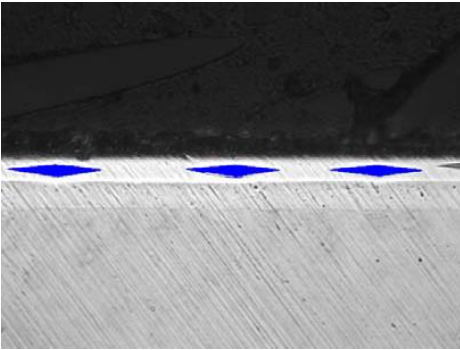


Figure 2: Indents as measured, binarized into blue bitplane.

Equipment

Analysis System:	Clemex CMT
Hardness tester:	Mitutoyo (modified)
Camera:	Sony XC-75 (B&W)
Objectives:	10X and 40X
Stage:	Motorized Marzhauser 50X50mm
Indenter:	Knoop

Sample Description

One sample of steel plated with nickel and hard chromed.

Purpose of Analysis

Demonstrate the ability of the Clemex Computerized Microhardness Tester (CMT) to automatically perform and measure indentations on the coating.

Procedure

Due to the thin coating layer (approximately 9 to 10 μm), the testing loads should be chosen properly. The first indent was made with 200 gf load, and the second one with 100 gf and then with 50 gf load. Five areas were selected to build the indent pattern and the automatic analysis was initiated. Five indentations were automatically made, once completed, the motorized turret brought the 40X objective in place, automatically focused on each indent and measured accordingly.

Results

Indent #	Hard. (HK)	Depth (μm)	H Diag. (μm)	V Diag. (μm)
1	687.2	0.0	32.2	4.3
2	680.3	51.0	32.3	4.5
3	680.2	90.0	32.4	4.0
4	660.0	165.0	32.9	4.3
5	669.9	315.0	32.6	4.2

The measurements were repeated on the 5 indents for three times. The Knoop indents were all around 32 μm in length and 4.5 μm in width.