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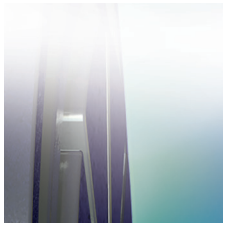
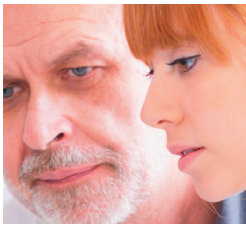
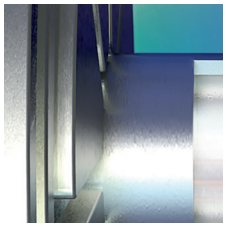
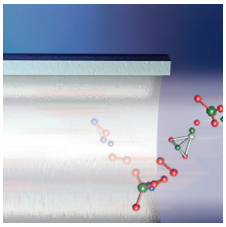
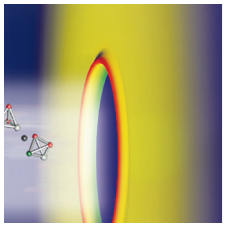


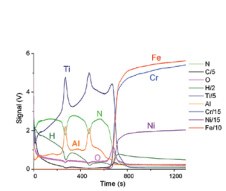
DiP
Differential Interferometry Profiling

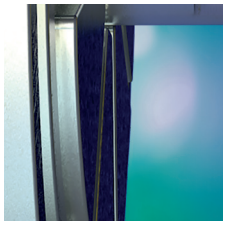


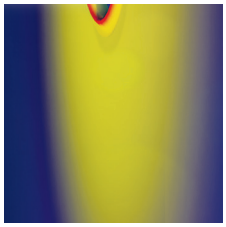












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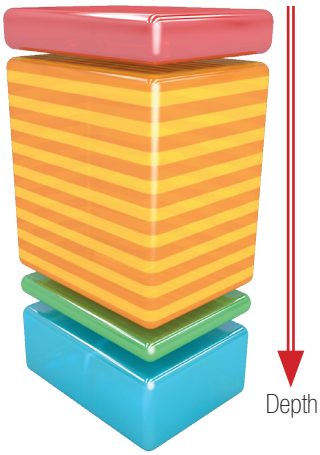
DiP: Differential Interferometry Profiling

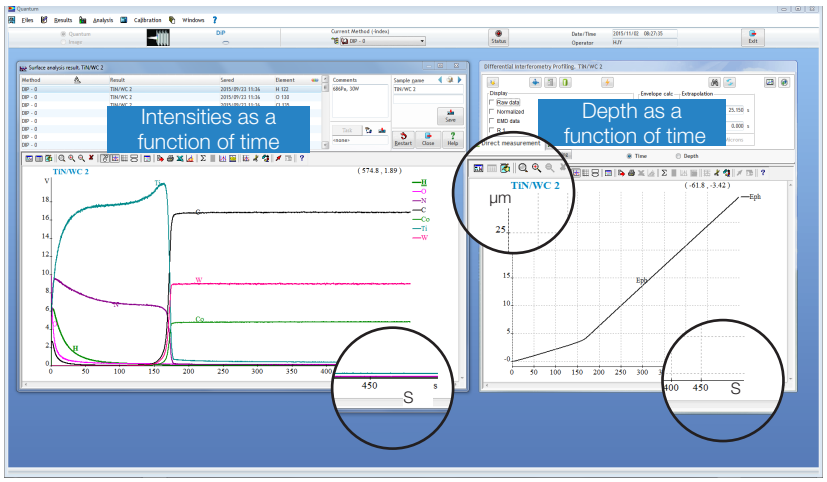
An innovation in Glow Discharge Optical Emission Spectrometry (GDOES) relating to the direct measurement of layer thickness, erosion rates and GD crater depth.

GDOES is used for fast elemental depth profile analysis of thin and thick films with thickness ranging from one nanometer to over 100 microns. The erosion rates in GDOES are material dependent, and when multi-layers are measured, they change with depth. Previously, the estimation of these erosion rates was the result of calculations (prone to uncertainties) or external measurements.

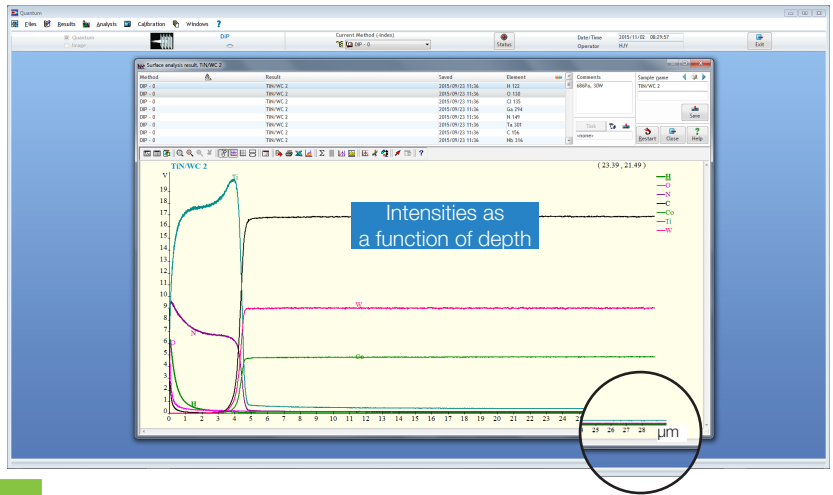
Thanks to DiP, a direct measurement of the depth as a function of time, with nanometric precision, is performed simultaneously with the GD analysis.

Intensity as a function of time + Depth as a function of time = Intensity as a function of depth





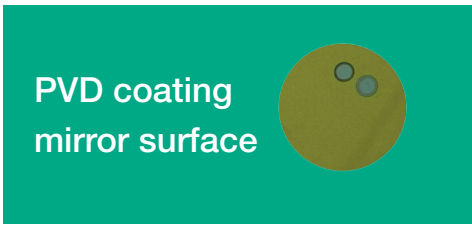
Surface Measurement and DiP windows.
In the DiP window (right) the changes of slopes reflect the changes in erosion rates between layers. These erosion rates are directly obtained by the interferometric measurement.

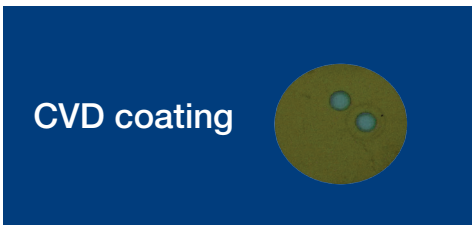


Measurement with time axis directly converted in depth using DiP in Quantum software.

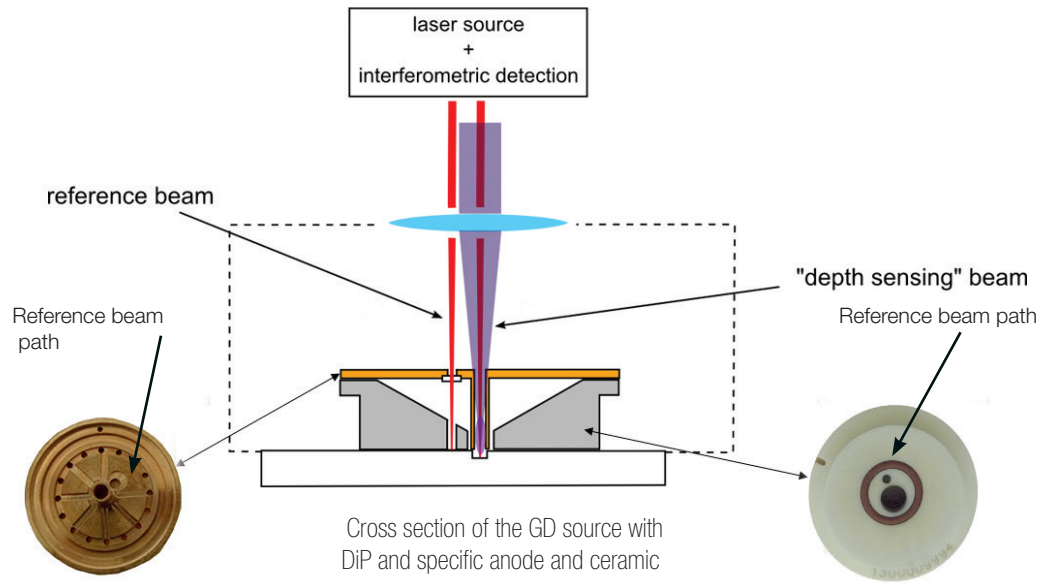
Domains of applications

Samples need to be partially reflective. Surfaces with low roughness are therefore preferred, but mirror surfaces are not mandatory. To the right are 2 samples of TiN/WC deposited by PVD (top) and by CVD (bottom). The top sample has a mirror like surface, while the lower one is less specular, but both are suitable for DiP.





DiP operation principle: Interferometric measurement.



Cross section of the GD source with DiP and specific anode and ceramic

Sapphire sample: The two beams are visible by transparency

A laser source is separated into two beams: The reference one is directed on the intact surface of the sample, while the depth sensing one is directed on the middle of the GD measured area.

The interference between the two reflected beams is measured as the sample is sputtered, giving a direct measurement of the crater depth.

Upgrade existing GD instruments

DiP can be retrofitted on existing instruments as the design of the optical interface does not modify the light throughput towards the spectrometers.

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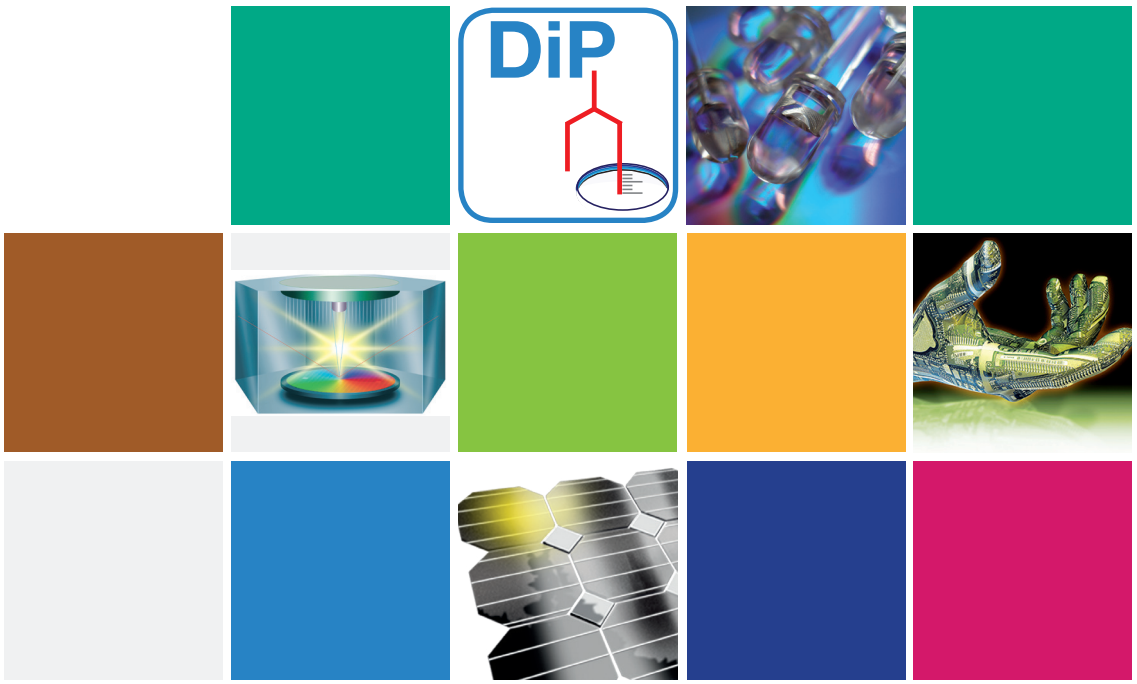

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