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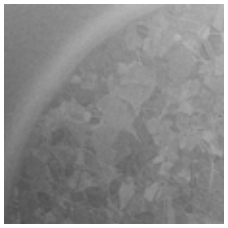
GDOES

Smart use of GDOES: Sample preparation for SEM & EBSD



Application Note

Metallurgy GD20

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Abstract
Pulsed RF Glow Discharge Optical Emission Spectrometry is known for Ultra Fast Elemental Depth Profiling capability of thin and thick films. In addition the unique characteristics of the Pulsed RF plasma source make it an interesting tool for sample preparation prior to SEM or EBSD observations.

Key words
RF GD OES, Sample preparation for SEM, Sample preparation for EBSD, Pulsed RF source.

Introduction

RF GD OES is well known for ultra fast elemental depth profile of thin and thick films. The unique characteristics of the GD plasma (large sputtered zone, dense plasma, low energy incident particles) make it also an interesting tool for sample preparation prior to SEM or EBSD.

Instrumentation

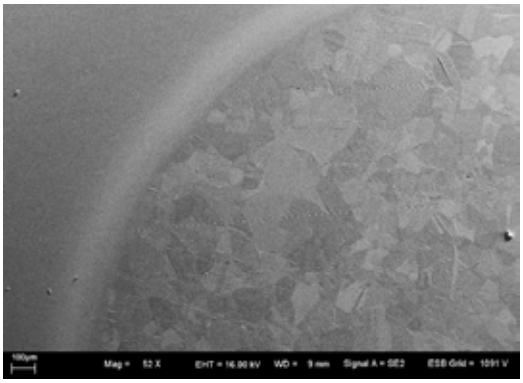
The GD Profiler 2 couples an advanced Pulsed RF Glow Discharge Source to a high resolution, wide spectral range Optical Emission Spectrometer.

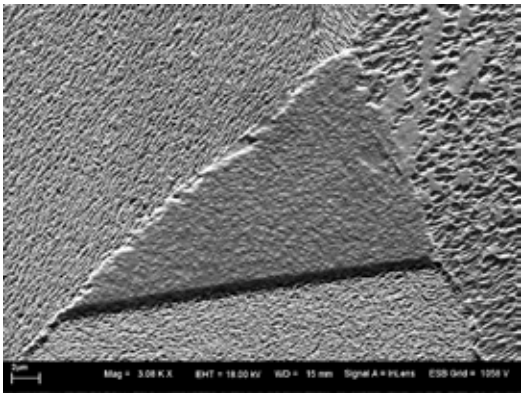
The source permits a precise and fast sputtering of a representative part of the material investigated (typically 4mm in diameter). The erosion permits to reveal the structure of the material when a high end SEM is used for observation.

The spectrometer at the same time simultaneously measures all elements of interest as a function of the sputtered depth.

GD Profiler 2

View of the source with schematized sample placed on it





Stainless steel mirror polished after 1s GD sputtering, grain structure resolved (Bottom: zoom)

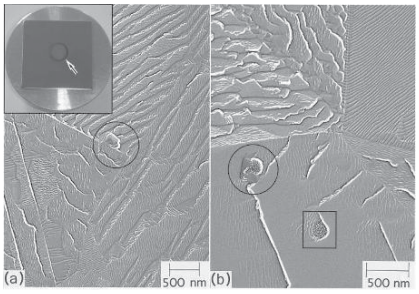
Key Features

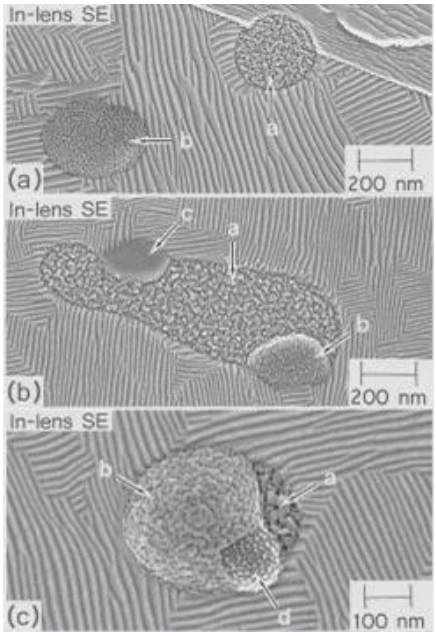
SPEED : Less than 10 seconds is enough to prepare a sample prior to SEM or EBSD observation.
EASE of USE: The GD source does not require any UHV, the sample to analyse is simply placed against an o'ring facing the anode tube in which the plasma is confined

Applications

Measurements of inclusions in a stainless steel.

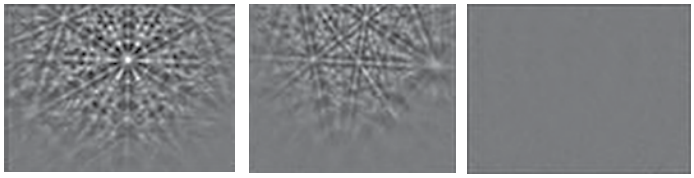
This application was shown by K. Shimizu at the 6th International GD day: a stainless steel was sputtered for a couple of seconds. The grain structure within the GD crater becomes visible for SEM observation and observed embedded inclusions even reveal structural inhomogeneities.





EBSD observation of WC

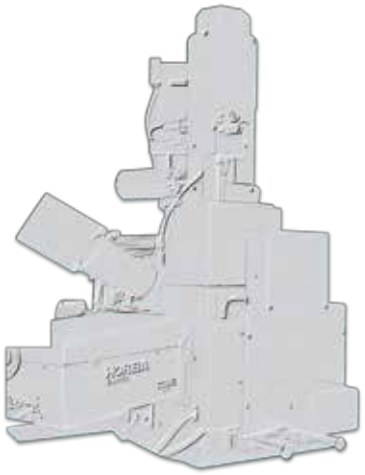
This application was shown by M Penoy at the 6th International GD day. A tungsten carbide was sputtered for a couple of seconds only. The grain structure within the GD crater permits EBSD measurements elsewhere only possible after 5 hours of tedious chemical polishing.



GD: 10 W - 3 sec | CP: 5h | Mechanical polishing

References

New Horizons of Applied Scanning Electron Microscopy by K Shimizu & T Mitani, Springer



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