XtndEDS – Flexible EDS Analysis with JEOL FE-SEM

SMART – POWERFUL – FLEXIBLE

SEM offers a unique ability to visualize specimen surface morphology (via secondary electron imaging), as well as obtain crystallographic or Z-contast information (via backscatter electron imaging) while at the same time performing chemical composition analysis via energy dispersive spectroscopy (EDS). In the past, this simultaneous acquisition was often hindered by deficiencies in detector and column design, that would not allow sufficient count rates or sufficient resolution for adequate analysis at various working distances.

JEOL FE-SEMs have been uniquely designed to allow additional flexibility for EDS acquisition while still maintaining best resolution at high probe currents. This variable WD acquisition can be performed without the need for any additional hardware. Moreover, JEOL's exclusive Aperture Angle Control Lens (ACL) assures that the best resolution and spot size are maintained at any kV and beam current settings required for EDS analysis.

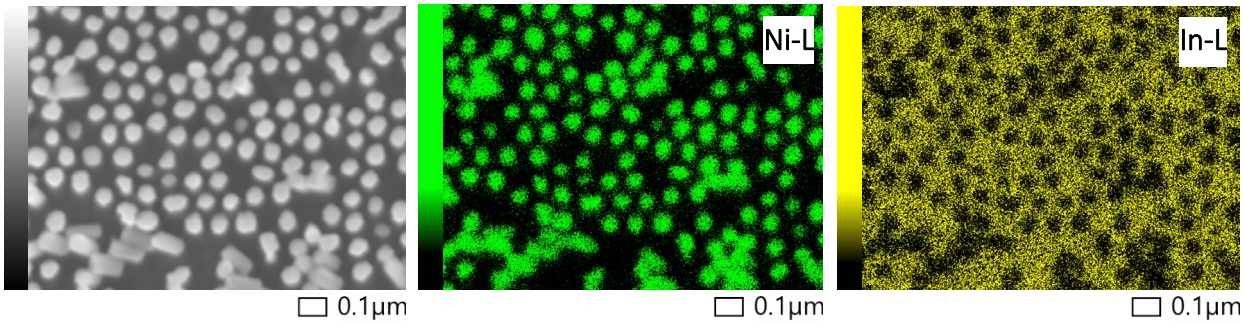

Fig. 1 EDS map of Ni pillars on ITO, acquired at 6 kV, 4 nA, WD=6mm, for 160 sec. Detector – JEOL 60 mm² EDS, JSM-IT800

As an example, JEOL FE-SEM can acquire high resolution EDS maps of nm scale features at 6 mm WD (Fig. 1) at low accelerating voltage to get the best spatial resolution. The figure shows an EDS map of Ni pillars on ITO substrate, acquired at 6kV, 4nA, 160 sec – the map is showing spatial resolution in the sub 50nm range acquired in less than 3 min.

Table 1 shows the count rates achievable at 6, 10, 15 and 20 mm WD for 5 kV and 15 kV without changing any other settings. These working distances cover a wide range of application space:

- 6 mm is applicable for nm scale resolution;
- 10 mm is intended for general purpose, large area, large specimen EDS analysis;
- 15 mm / 20 mm are intended for typical EBSD analysis setup where combined EDS/EBSD acquisition is of interest.

Vacc [kV]	WD [mm]	Count rate [CPS]
15	6	92,207
	10	149,418
	15	97,772
	20	32,230
5	6	30,624
	10	51,939
	15	31,754
	20	10,279

Table 1. EDS count rate vs. WD at 5 kV and 15 kV with JEOL 60 mm² EDS at 5 nA.