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ERRATUM

Erratum to: Lateral resolution of nanoscaled images delivered by surface-analytical instruments: application of the BAM-L200 certified reference material and related ISO standards

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Unfortunately one reference (number 14 in the new list of references, see below) was absent in the published list of references. The citation of this missing ref.14 in the published text (page 4, left column) is correct. Beginning on page 4, second column, last paragraph, the numbers of all references are wrong and must be corrected by adding one. In the following text this correction has been done:

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"Another analytical method able of mapping elemental composition is energy dispersive X-ray spectroscopy (EDX) at a SEM (scanning electron microscope). In the traditional "reflection" geometry and with bulk samples the spatial resolution is limited by the volume of interaction of the primary electrons with the atoms in the sample. This is the volume where the detected X-ray photons originate from and is typically in the range of roughly 1 μm^3. However, recently, it has been demonstrated that SEM working in the transmission mode (TSEM) enables traceable determination of nanoparticle size distribution [23, 24]. Coupling EDX to TSEM and employing thin electron transparent samples, e.g. FIB lamellae, prepared on TEM grids, results in a significant improvement of the spatial resolution in EDX element maps from the micrometer range down to well below 100 nm [25]. The limiting factor, however, is the low X-ray signal intensity emitted by the tiny amount of material in the lamellae. Recently developed large-area EDS detectors, however, deliver sufficient sensitivity to overcome the problem. The spatial resolution attained practically by EDX in combination with high-resolution TSEM mode can be determined by using a BAM-L200 lamella. An example of a linescan of the Al-Kα intensity across the gratings P11, P12, P13 and P14 of the BAM-L200 pattern acquired with a modern large-area EDS detector (100 mm^2 active area) in the TSEM mode is shown in Fig. 4. Note that the P11 grating (period 42 nm) is clearly resolved. Moreover, the presence of the weak Al Kα signal in the EDX linescan across the narrow stripe W11 (3.5 nm width) is remarkable. Further improvements of the signal to noise ratio by using more sensitive detectors may lead to significantly better results in the near future. The EDX line profile presented in Fig. 4 represents only a single linescan and was not extracted from the full data set of a hypermap. The latter option is available for SEM/EDX, too, but stability issues are often a critical

point at such high magnifications required to resolve features at the low nm scale.

Possible fine artifacts such as an eccentricity of the profile of the primary electron beam at the low nanometer scale range may occur but control on this problem can be reached readily by rotating BAM-L200 in a way which is analogues to that displayed for the SIMS case in Fig.1.

A traceable calibration of the magnification established in the TSEM images is also enabled by using a BAM-L200 lamella.

Intentionally the BAM-L200 CRM has been designed as a test sample for instruments which use a beam of primary ions, electrons or photons. Nevertheless applications in the field of scanning probe microscopy are possible, too. One example is the imaging of BAM-L200 by Kelvin probe force microscopy where lateral resolutions of better than 30 nm [26] and 10 nm [27], respectively, have been demonstrated."

The corrected list of references is as follows:

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