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lateral resolution

in in situ microanalysis

For qualitative analysis, this should be defined as the minimum distance of two points (areas) on the specimen corresponding to signal levels of 16 and 84%. For electron signals originating from top surface layers like secondary or Auger electrons and secondary ions the lateral resolution for qualitative purposes corresponds to the beam diameter. For signals originating in a greater depth of the sample (back scattered electrons, X-rays) the lateral resolution is worse than the corresponding value of the beam diameter due to the diffusion of the primary electrons. The lateral resolution may be determined exactly with a sandwich specimen or a sharp edge specimen, or approximately with a specimen showing a regular microstructure of known dimensions. Recommended abbreviation: Lat. Res. (qualitative); unit: m; range: nm or μm. For quantitative analysis, this should be defined as the minimum distance of two points (areas) on the specimen corresponding to signal ratios of 10^4. This condition assures that the value for the lateral resolution defines the diameter of the analytical area which yields the total analytical signal. Due to the effect of electron diffusion in a solid and 'tail effects' in ion beam analysis the quantitative lateral resolution is significantly larger than the beam diameter. Recommended abbreviation: Lat. Res. (quantitative); unit: m; range: nm or μm.

Source:

PAC, 1983, *55*, 2023 *(Nomenclature, symbols and units recommended for in situ microanalysis (Provisional))* on page 2027

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