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[\[PDF \(1925K\)\]](#) [\[References\]](#) [\[Supplementary Materials\]](#)**Surface Excitations in Surface Electron Spectroscopies Studied by Reflection Electron Energy-Loss Spectroscopy and Elastic Peak Electron Spectroscopy**[Takaharu NAGATOMI](#)¹⁾ and [Shigeo TANUMA](#)²⁾*1) Department of Material and Life Science, Graduate School of Engineering, Osaka University**2) Materials Analysis Station, National Institute for Materials Science***(Received October 2, 2009)****(Accepted December 26, 2009)**

Surface excitations, in addition to bulk excitation, undergone by signal electrons in surface electron spectroscopies, such as Auger electron spectroscopy, and X-ray photoelectron spectroscopy, play an important role in the formation of electron spectra. Those inelastic scattering processes not only induce decay in the peak intensity, but also form background appearing in the lower kinetic energy side of relevant peaks. Information on surface excitation is essential in addition to bulk excitations for the quantification of material surfaces by surface electron spectroscopies, and extensive studies have been devoted to it. In this report, we introduce the basics of the study of surface excitations by reflection electron energy loss spectroscopy (REELS) and elastic peak electron spectroscopy (EPES). The application of several approaches within the schemes of EPES analysis and REELS analysis to the experimental determination of inelastic scattering parameters, such as the surface excitation parameter (SEP), differential SEP (DSEP), inelastic mean free path (IMFP), and dielectric function, are also introduced. Information useful to calculate the values of the IMFP and SEP using predictive equations is provided in Supporting Information as well.

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