

PRINCIPAL COMPONENT ANALYSIS  
OF ANGULAR DEPENDENCES  
OF REFLECTION ELECTRON  
ENERGY LOSS SPECTRA OF Ge

*A.M. Konovalov, Yu.M. Krynko, M.G. Nakhodkin*

Taras Shevchenko Kyiv National University,  
Faculty of Radiophysics  
(64, Volodymyrska Str., Kyiv 01033, Ukraine;  
e-mail: kan@univ.kiev.ua)

S u m m a r y

Angular dependences of reflection electron energy loss (REEL) spectra of polycrystalline germanium for primary electron energies of 300 and 500 eV and under various experimental geometry conditions have been explored. It has been found that within the range of electron scattering angles of 94–146°, the REEL spectra of Ge can be described by linear combinations of three components. The first component contains the single surface plasmon peak, the second component the single bulk plasmon peak, and the third component none of them. The relative intensities of the REEL spectrum components depend differently on the electron incidence, reflection, and scattering angles. The strongest dependence on the electron scattering angle was observed for the bulk plasmon peak. In the scattering angle range of 94–146°, its intensity can vary by a factor of 2.8, whereas the intensity of the surface plasmon peak varies no more than by a factor of 1.3. These features of spectra should be taken into account both in quantitative REEL spectroscopy and when developing relevant physical models.