

Experimental and theoretical Determination of Low electron Energy Loss spectra of Ag and Ru

C. Hebert^a, W.-D. Schöne^b, D. S. Su^c

^aInstitut für Festkörperphysik, Technische Universität Wien, A-1040 Wien

^bDepartment of Physical Chemistry, Fritz-Haber- Institut of the Max-Planck-Society, Faradayweg 4-6, D-14195 Berlin

^cDepartment of Inorganic Chemistry, Fritz-Haber- Institut of the Max-Planck-Society, Faradayweg 4-6, D-14195 Berlin

Abstract

We show the experimental and calculated q -dependent low energy loss electron energy loss spectrum of Ru and Ag. The spectra were calculated within the time-dependent density-functional theory including local-field effects. For Ag, the momentum transfer was parallel to the (110) direction. For Ru the 3 main directions (010), (110) and (001) were investigated. The agreement between theory and experiment is very good for Ag and momentum transfers parallel to the (001) direction of Ru. For momentum transfers parallel to the in-plane directions (110) and (010) the agreement for Ru is not satisfactory, which could be attributed to relativistic effects or strong localization of the $4d$ states of Ru.

Key words: Electron Energy Loss spectroscopy, linear response