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Surface plasmon excitation in ultrathin Mg films on Si(111) AO TENG, The University of Tennessee, Knoxville, TN, GEUNSEOP LEE, Inha University, Incheon, Korea, SABAN HUS, The University of Tennessee, Knoxville, TN, HANNO WEITERING, The University of Tennessee, Knoxville, TN & Oak Ridge National Laboratory, Oak Ridge,TN — We investigated the dispersion of the surface plasmon in ultrathin Mg(0001) films, grown on a Si(111)-7×7 surface, as a function of film thickness and parallel momentum ($q_{||}$), using angle-resolved high-resolution electron-energy-loss spectroscopy (HREELS). In Mg films thicker than ~ 3 ML, surface plasmon excitations exhibit negative dispersions for small $q_{||}$(long wavelength limit). In contrast, the surface plasmons of ultrathin Al(111) films are known to exhibit positive dispersions near $q_{||} \sim 0$. The surface plasmon energies of the Mg films increase as the film thickness decreases. The plasmon line widths reveal similar trends, namely, for a given film thickness the line width decreases initially with increasing $q_{||}$ while it increases with film thickness. Possible explanations for the observed thickness dependence of the surface plasmon dispersion and damping will be discussed.

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