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Ultrathin CoO (100) films on Fe_3O_4 (100): a photoemission study[1] HUI-QIONG WANG*, ERIC I. ALTMAN**, VICTOR E. HENRICH*, Departments of Applied Physics* andChemical Engineering**, Center for Research on Interface Structures and Phenomena (CRISP), Yale University — Using molecular beam epitaxy (MBE), 1 to 20 monolayer (ML) thick CoO (100) films were grown monolayer by monolayer on Fe_3O_4 (100) substrates. Auger measurements as a function of CoO film thickness indicated a layer-by-layer growth mode. Ultraviolet photoelectron spectroscopy (UPS) was used to monitor the evolution of the thin film electronic properties. To avoid oxidizing the Fe_3O_4 surface, Co was deposited in UHV and then oxidized for each monolayer. By comparing UPS spectra taken before and after oxidization of the Co, the separate contributions of Co and oxygen to the valence band electronic structure could be identified. Very thin (*e.g.*, 1 – 3 ML) films exhibit valence band structures very different from those of bulk CoO. The interfacial electronic states were analyzed by comparing measured and model UPS spectra.

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