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Trends in core-level shifts at bimetallic interfaces formed by group-10 metals deposited on W(110) D.M. RIFFE, Utah State University — The monolayer bimetallic interface formed by the deposition of Ni, Pd, or Pt on W(110) provides a quintessential setting for investigating the chemical interactions between early and late transition metals. Perhaps surprisingly, these group-10 metals behave as noble metals in this setting. To study the chemical interactions in detail we have obtained core-level photoemission data from W(110) surface atoms for group-10 metals deposited at submonolayer to monolayer coverages. Commonalities among the bimetallic interfaces include the following: (i) a separate substrate core-level shift can be identified for each overlayer phase (1D, pseudomorphic, and/or commensurate); (ii) commensurate overlayers produce only one substrate core-level shift, even though not all substrate atoms are equivalently coordinated; (iii) the difference in substrate shifts induced by pseudomorphic and commensurate overlayers contains a large structural contribution; (iv) for a pseudomorphic overlayer the ratio of the group-10-atom to W-atom core-level shift (when referenced to binding energies at the respective clean surfaces) is 4 for all three systems; (v) a partial-shift Born-Haber-cycle analysis semiquantitatively describes the substrate shifts induced by both the pseudomorphic and commensurate layers; and (vi) the corresponding core-level shifts on W(110) are very similar to those induced on W(111).

D.M. Riffe
Utah State University

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