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Surface State Modification of XRu_2Si_2 , $\text{X}=(\text{La}, \text{Ce}, \text{Th}, \text{U})$ ¹
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MAPLE, UC San Diego — The three-dimensional electronic structures of heavy
fermion f-electron materials XRu_2Si_2 $\text{X}=(\text{Ce}, \text{U})$ and their non-f reference materials
($\text{X}=\text{La}, \text{Th}$) are investigated using photon-dependent angle-resolved photoemission
spectroscopy (ARPES). The spatial-dependences of the characterization of UHV-
cleaved surfaces combined with guidance from theoretical surface slab calculations
clearly identify surface termination related features resulting from cleavage between
X-Si layers. Experimental ARPES results are shown for various adsorbate and dos-
ing experiments that suppress or modify the surface states via Si adatom bonding
or charge transfer. These results greatly aid the clear identification of the true bulk
bands. Differences in the surface state electronic structures between $\text{X}=(\text{La}, \text{Ce},$
 $\text{Th}, \text{U})$ arise mainly from different band fillings related to the valence of the bulk X
atom.

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