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Absolute Photoionization Cross Sections for Br^{2+} in the $4p \rightarrow 4d$ and $3d \rightarrow 4p$ Energy Regions[1] A. AGUILAR, ALS-LBNL, Berkeley, A.M. JUAREZ, ICF-UNAM, Mexico, R.C. BILODEAU, Western Michigan U., Kalamazoo, D.A. ESTEVES, U. of Nevada, Reno, D.A. HARDY, E.C. RED, ALS-LBNL, Berkeley — Absolute single photoionization cross-section measurements are reported for Br^{2+} in the 31 eV to 46 eV and 64 eV to 72 eV photon energy ranges. The first energy range includes the low-lying $^2P_{3/2,1/2}$ and $^2D_{5/2,3/2}$ metastable state thresholds and extends for 10 eV above the $^4S_{3/2}$ ground state threshold. Strong photoexcitation-autoionization resonances due to 4p$\rightarrow nd$ transitions are seen in the cross-section spectrum and identified based on a quantum-defect analysis of the series. The systematic behavior of the quantum defect parameter of some of the Rydberg series observed in the Br^{2+} spectrum as well as in previously measured Se^+ spectrum, are analyzed as a function of the nuclear charge. The 64 eV to 72 eV energy range contains discrete structure that arises from $3d \rightarrow$np excitations. The R-matrix photoionization cross section calculations of Cummings and O'Sullivan, PRA, 54 (1996) are compared to our absolute cross section measurements in this energy range.

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