

ROTATIONALLY RESOLVED PHOTOELECTRON SPECTROSCOPY OF ArXe AND KrXe

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The high resolution spectroscopic information available on the low-lying electronic states of ArXe⁺ and KrXe⁺ is limited to vibrationally resolved emission spectra of the C₂ 1/2 → (X 1/2, A₂ 1/2), B 1/2 → (X 1/2, A₂ 1/2) and C₁ 3/2 → A₁ 3/2 band systems^{a,b} and to vibrationally resolved threshold photoelectron spectra of ArXe^{c,d} and KrXe^{e,f}. Recently *ab initio* potential functions for these states have been reported^g.

Rotationally resolved photoelectron spectra of the lowest three electronic states of ArXe⁺ and KrXe⁺ have been recorded by PFI-ZEKE photoelectron spectroscopy following 1_{VUV}+1' resonant two-photon excitation from the X 0⁺ ground state of ArXe and KrXe via selected rotational levels of the C 1 and D 0⁺ excited states (C 0⁺ and D 1 in the case of KrXe)^{h,i}. The bandwidth of the vacuum-ultraviolet radiation used to access the intermediate states was narrow enough to enable the selection of individual isotopomers. Photoelectron spectra recorded from several rovibrational levels of the intermediate states provided access to the X 1/2 (*v*⁺ = 0–15), A₁ 3/2 (*v*⁺ = 0–3) and A₂ 1/2 (*v*⁺ = 0–8) levels of ArXe⁺ and the X 1/2 (*v*⁺ = 5, 22, 28) and A₁ 3/2 (*v*⁺ = 3–5) levels of KrXe⁺. The analysis of the rovibrational structure of the photoelectron spectra led to improved spectroscopic parameters for these states and to a better description of the low-lying electronic states of ArXe⁺ and KrXe⁺.

^aK. P. HUBER AND R. H. LIPSON, *J. Mol. Spectrosc.* **119**, 433 (1986).

^bM. TSUJI, M. TANAKA AND Y. NISHIMURA, *Chem. Phys. Lett.* **262**, 349 (1996).

^cH. YOSHII, T. HAYAISHI, T. ONUMA, T. AOTO, Y. MORIOKA AND K. ITO, *J. Chem. Phys.* **116**, 7468 (2002).

^dO. ZEHNDER AND F. MERKT, *J. Chem. Phys.* **128**, 014306 (2008).

^eH. YOSHII, T. TANAKA, Y. MORIOKA, T. HAYAISHI AND K. ITO, *J. Chem. Phys.* **111**, 10595 (1999).

^fO. ZEHNDER AND F. MERKT, *Mol. Phys.* **106**, 1215 (2008).

^gL. A. VIEHLAND, B. R. GRAY AND T. G. WRIGHT, *Mol. Phys.* **108**, 547 (2010).

^hL. PITICCO, F. MERKT, A. A. CHOLEWINSKI, F. R. W. MCCOURT AND R. J. LE ROY, *J. Mol. Spectrosc.* **264**, 83 (2010).

ⁱL. PITICCO, M. SCHÄFER AND F. MERKT, *J. Chem. Phys.* **136**, 074304 (2012).