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X-ray emission measurements following charge exchange between O^{8+} and Kr[1] R. T. ZHANG, C. C. HAVENER, Physics Div., Oak Ridge National Laboratory, Oak Ridge, Tennessee 37831, D. G. SEELY, Dep. of Physics, Albion College, Albion, Michigan 49224, V. M. ANDRIANARIJAONA, Dep. of Physics, Pacific Union College, Angwin, California 94508, M. FOGLE, Dep. of Physics, Auburn University, Auburn, Alabama 36849, P. C. STANCIL, Dep. of Physics and Astronomy, University of Georgia, Athens, Georgia 30602-2451, D. WULF, D. MCCAMMON, Dep. of Physics, University of Wisconsin, Madison, Wisconsin 53706 — Lyman spectra and line-ratios for soft X-ray following charge exchange between O^{8+} and Kr were measured using a beam-gas technique and a high resolution microcalorimeter X-ray detector for the collision velocities from 293 km/s to 1256 km/s. Ly-α, Ly-β, Ly-γ, Ly-δ, Ly-ε lines of O^{7+} ion were identified, as well as minor transition lines from O^{6+}. Our observed line ratios are compared to a single charge exchange model, specifically with theoretical calculations for O^{8+} - H. Good agreement is found for the line ratio from the dominant $n = 5$ capture states, with direct capture and cascade having an important influence on the line ratio for the $n = 4$ states. Moreover, for velocities lower than 600 km/s, X-ray emission following autoionizing double capture results in Ly-α and Ly-β enhancement, the former leads to the Ly-ε/Ly-α line ratios significantly smaller than theoretical calculations, the latter leads to the Ly-β/Ly-α line ratios larger than theory. The apparatus is being modified to perform measurements with H using a merged-beam technique.

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