

Table 7a. X-ray Energies and Intensities (per 100 K-Shell Vacancies)

	5B	6C	7N	8O	9F	10Ne	11Na	12Mg	13Al	14Si	15P	16S	17Cl	18Ar	19K
$K_{\alpha 1}$	0.183 0.11 ₅	0.277 0.19 ₈	0.392 0.35 ₁₄	0.525 0.55 ₂₂	0.677 0.9 ₄	0.849 1.20 ₁₂	1.041 1.53 ₁₆	1.254 2.0 ₂	1.487 2.6 ₃	1.740 3.3 ₃	2.010 4.1 ₄	2.308 5.0 ₅	2.622 6.1 ₆	2.957 7.3 ₇	3.314 8.5 ₉
$K_{\alpha 2}$	0.183 0.056 ₂₃	0.277 0.09 ₄	0.392 0.17 ₇	0.525 0.28 ₁₁	0.677 0.43 ₁₇	0.848 0.60 ₆	1.041 0.77 ₈	1.254 1.00 ₁₀	1.486 1.29 ₁₃	1.739 1.64 ₁₇	2.009 2.04 ₂₁	2.307 2.49 ₂₅	2.621 3.0 ₃	2.955 3.6 ₄	3.311 4.3 ₄
$K_{\beta 1}$									1.554 0.0155 ₁₆	1.836 0.056 ₆	2.136 0.122 ₁₂	2.464 0.229 ₂₃	2.816 0.38 ₄	3.190 0.58 ₆	3.590 0.79 ₈
$K_{\beta 3}$									1.554 0.0079 ₈	1.836 0.028 ₃	2.136 0.062 ₆	2.464 0.116 ₁₂	2.816 0.192 ₂₀	3.190 0.30 ₃	3.590 0.40 ₄
$L_{\beta 1}$														0.251 0.011 ₃	0.296 0.013 ₄
$L_{\beta 3}$														0.310 0.0038 ₁₃	0.359 0.0050 ₁₇
$L_{\beta 4}$														0.310 0.0024 ₉	0.359 0.0010 ₅

	20Ca	21Sc	22Ti	23V	24Cr	25Mn	26Fe	27Co	28Ni	29Cu	30Zn	31Ga	32Ge	33As	34Se
$K_{\alpha 1}$	3.692 9.8 ₄	4.091 11.3 ₅	4.511 12.8 ₆	4.952 14.5 ₇	5.415 16.4 ₇	5.899 18.3 ₈	6.404 20.2 ₉	6.930 22.1 ₁₀	7.478 24.0 ₁₁	8.048 26.0 ₁₂	8.639 28.0 ₁₀	9.252 29.8 ₁₁	9.886 31.3 ₁₁	10.544 32.7 ₁₂	11.222 34.1 ₁₂
$K_{\alpha 2}$	3.688 4.93 ₂₂	4.086 5.68 ₂₅	4.505 6.4 ₃	4.945 7.3 ₃	5.405 8.3 ₄	5.888 9.3 ₄	6.391 10.2 ₅	6.915 11.2 ₅	7.461 12.2 ₆	8.028 13.3 ₆	8.616 14.3 ₅	9.225 15.2 ₆	9.855 16.1 ₆	10.508 16.8 ₆	11.182 17.6 ₆
$K_{\beta 1}$	4.013 1.02 ₅	4.461 1.22 ₆	4.932 1.42 ₆	5.427 1.64 ₇	5.947 1.84 ₈	6.490 2.14 ₁₀	7.058 2.40 ₁₁	7.649 2.65 ₁₂	8.265 2.88 ₁₃	8.905 3.10 ₁₄	9.572 3.39 ₁₂	10.264 3.70 ₁₃	10.982 3.98 ₁₄	11.726 4.25 ₁₅	12.496 4.54 ₁₆
$K_{\beta 2}$												10.366 0.0314 ₁₁	11.101 0.097 ₄	11.864 0.194 ₇	12.652 0.323 ₁₂
$K_{\beta 3}$	4.013 0.519 ₂₃	4.461 0.62 ₃	4.932 0.72 ₃	5.427 0.84 ₄	5.947 0.94 ₄	6.490 1.09 ₅	7.058 1.23 ₆	7.649 1.36 ₆	8.265 1.48 ₇	8.905 1.59 ₇	9.572 1.74 ₆	10.260 1.90 ₇	10.975 2.05 ₇	11.720 2.19 ₈	12.490 2.34 ₈
$K_{\beta 5}$							7.108 0.00127 ₇	7.706 0.00188 ₁₁	8.329 0.00264 ₁₅	8.977 0.00365 ₂₁	9.651 0.00504 ₂₅	10.350 0.0063 ₃	11.074 0.0078 ₄	11.826 0.0095 ₅	12.601 0.0116 ₆
$L_{\alpha 1}$		0.396 0.026 ₇	0.452 0.063 ₁₆	0.511 0.12 ₃	0.572 0.19 ₅	0.637 0.26 ₇	0.704 0.33 ₈	0.776 0.41 ₁₀	0.851 0.50 ₁₃	0.929 0.60 ₁₅	1.012 0.65 ₁₃	1.098 0.70 ₁₄	1.188 0.81 ₁₆	1.282 0.87 ₁₇	1.379 0.98 ₂₀
$L_{\alpha 2}$		0.396 0.0028 ₇	0.452 0.0070 ₁₈	0.511 0.013 ₃	0.572 0.021 ₅	0.637 0.029 ₇	0.704 0.037 ₉	0.776 0.045 ₁₁	0.851 0.056 ₁₄	0.929 0.066 ₁₇	1.012 0.072 ₁₅	1.098 0.077 ₁₆	1.188 0.090 ₁₈	1.282 0.096 ₁₉	1.379 0.108 ₂₂
$L_{\beta 1}$	0.350 0.016 ₄	0.400 0.020 ₅	0.458 0.050 ₁₂	0.518 0.096 ₂₄	0.581 0.15 ₄	0.648 0.20 ₅	0.717 0.25 ₆	0.791 0.31 ₈	0.868 0.34 ₉	0.949 0.39 ₁₀	1.035 0.42 ₁₁	1.125 0.46 ₁₂	1.219 0.49 ₁₂	1.317 0.52 ₁₃	1.420 0.58 ₁₅
$L_{\beta 3}$	0.412 0.0062 ₁₉	0.468 0.0075 ₂₃	0.529 0.009 ₃	0.590 0.010 ₃	0.652 0.012 ₄	0.720 0.014 ₄	0.792 0.016 ₅	0.866 0.018 ₅	0.940 0.020 ₆	1.022 0.021 ₆	1.107 0.023 ₇	1.195 0.024 ₇	1.294 0.025 ₇	1.386 0.027 ₈	1.492 0.029 ₉
$L_{\beta 4}$	0.412 0.0039 ₁₂	0.468 0.0048 ₁₅	0.529 0.0056 ₁₇	0.590 0.0067 ₂₀	0.652 0.0079 ₂₄	0.720 0.009 ₃	0.792 0.010 ₃	0.866 0.012 ₄	0.940 0.013 ₄	1.022 0.014 ₄	1.107 0.015 ₅	1.191 0.016 ₅	1.286 0.016 ₅	1.380 0.018 ₅	1.486 0.019 ₆
$L_{\beta 6}$		0.402 0.0017 ₄	0.456 0.0018 ₅	0.513 0.0022 ₆		0.640 0.0023 ₆	0.708 0.0022 ₆	0.779 0.0022 ₆	0.855 0.0022 ₆		1.020 0.0021 ₄	1.114 0.0027 ₅	1.212 0.0033 ₇	1.315 0.0038 ₈	1.424 0.0045 ₉
$L_{\gamma 3}$												1.297 0.0012 ₄	1.412 0.0042 ₁₃	1.524 0.0047 ₁₅	1.648 0.0051 ₁₆
L_{η}		0.353 0.020 ₅	0.401 0.022 ₆	0.454 0.026 ₇	0.510 0.025 ₆	0.568 0.026 ₇	0.628 0.028 ₇	0.693 0.028 ₇	0.760 0.026 ₇	0.831 0.028 ₇	0.907 0.029 ₇	0.984 0.030 ₈	1.068 0.031 ₈	1.155 0.031 ₈	1.245 0.034 ₉
L_{ζ}		0.348 0.026 ₇	0.395 0.029 ₈	0.446 0.034 ₉	0.500 0.033 ₉	0.556 0.038 ₁₀	0.615 0.040 ₁₁	0.678 0.043 ₁₁	0.743 0.045 ₁₂	0.811 0.048 ₁₃	0.884 0.047 ₁₀	0.957 0.048 ₁₀	1.037 0.052 ₁₁	1.120 0.053 ₁₁	1.204 0.056 ₁₂

	35Br	36Kr	37Rb	38Sr	39Y	40Zr	41Nb	42Mo	43Tc	44Ru	45Rh	46Pd	47Ag	48Cd	49In
$K_{\alpha 1}$	11.924 35.6 ₁₃	12.651 36.8 ₁₃	13.395 38.0 ₁₄	14.165 39.1 ₁₄	14.958 40.1 ₁₄	15.775 41.0 ₁₂	16.615 41.8 ₁₂	17.479 42.6 ₁₂	18.367 43.3 ₁₂	19.279 44.0 ₁₂	20.216 44.6 ₁₃	21.177 45.1 ₁₃	22.163 45.6 ₁₃	23.174 46.1 ₁₃	24.210 45.3 ₁₃
$K_{\alpha 2}$	11.878 18.4 ₇	12.598 19.0 ₇	13.336 19.7 ₇	14.098 20.3 ₇	14.883 20.9 ₈	15.691 21.4 ₆	16.521 21.9 ₆	17.374 22.4 ₆	18.251 22.8 ₆	19.150 23.2 ₇	20.074 23.5 ₇	21.020 23.9 ₇	21.990 24.2 ₇	22.984 24.5 ₇	24.002 24.5 ₇
$K_{\alpha 3}$													21.708 0.00100 ₄	22.693 0.00115 ₄	23.702 0.00135 ₅
$K_{\beta 1}$	13.292 4.84 ₁₇	14.111 5.12 ₁₉	14.961 5.39 ₁₉	15.836 5.63 ₂₀	16.738 5.89 ₂₁	17.667 6.15 ₁₇	18.623 6.35 ₁₈	19.607 6.61 ₁₉	20.619 6.80 ₁₉	21.657 6.99 ₂₀	22.724 7.18 ₂₀	23.819 7.35 ₂₁	24.943 7.52 ₂₁	26.095 7.69 ₂₂	27.276 7.85 ₂₂
$K_{\beta 2}$	13.469 0.484 ₁₈	14.311 0.676 ₂₄	15.185 0.85 ₃	16.085 1.00 ₄	17.013 1.13 ₄	17.969 1.25 ₄	18.952 1.33 ₄	19.965 1.45 ₄	21.005 1.54 ₄	22.074 1.64 ₅	23.172 1.72 ₅	24.299 1.79 ₅	25.455 1.88 ₅	26.644 1.98 ₆	27.863 2.09 ₆
$K_{\beta 3}$	13.284 2.50 ₉	14.104 2.64 ₁₀	14.952 2.78 ₁₀	15.825 2.91 ₁₀	16.726 3.04 ₁₁	17.653 3.17 ₉	18.607 3.28 ₉	19.590 3.41 ₁₀	20.599 3.51 ₁₀	21.634 3.61 ₁₀	22.699 3.71 ₁₀	23.791 3.81 ₁₁	24.912 3.90 ₁₁	26.060 3.99 ₁₁	27.238 4.07 ₁₂
$K_{\beta 4}$						18.982 0.0010 ₅	19.998 0.0015 ₇	21.042 0.0023 ₁₁	22.115 0.0032 ₁₆	23.217 0.0043 ₂₁	24.349 0.006 ₃	25.511 0.007 ₃	26.702 0.008 ₄	27.924 0.010 ₅	
$K_{\beta 5}$	13.404 0.0139 ₇	14.231 0.0162 ₈	15.089 0.0186 ₉	15.971 0.0215 ₁₁	16.880 0.0244 ₁₂	17.816 0.0275 ₁₂	18.780 0.0305 ₁₄	19.771 0.0341 ₁₅	20.789 0.0377 ₁₇	21.836 0.0418 ₁₉	22.911 0.0446 ₂₀	24.013 0.0496 ₂₂	25.144 0.0547 ₂₅	26.304 0.060 ₃	27.493 0.065 ₃
$KO_{2,3}$															27.939 0.0170 ₁₈
$L_{\alpha 1}$	1.481 1.09 ₂₂	1.581 1.20 ₂₄	1.694 1.3 ₃	1.806 1.4 ₃	1.923 1.5 ₃	2.042 1.66 ₂₅	2.166 1.8 ₃	2.293 1.9 ₃	2.424 2.0 ₃	2.558 2.1 ₃	2.697 2.3 ₃	2.839 2.4 ₄	2.984 2.5 ₄	3.134 2.6 ₄	3

Table 7a. X-ray Energies and Intensities (per 100 K-Shell Vacancies) (continued)

	⁶⁵ Tb	⁶⁶ Dy	⁶⁷ Ho	⁶⁸ Er	⁶⁹ Tm	⁷⁰ Yb	⁷¹ Lu	⁷² Hf	⁷³ Ta	⁷⁴ W	⁷⁵ Re	⁷⁶ Os	⁷⁷ Ir	⁷⁸ Pt	⁷⁹ Au
$K_{\alpha 1}$	44.482 47.5 ₁₀	45.998 47.5 ₁₀	47.547 47.5 ₁₀	49.128 47.5 ₁₀	50.742 47.4 ₁₀	52.389 47.4 ₁₀	54.070 47.3 ₁₀	55.790 47.1 ₁₀	57.535 47.2 ₁₀	59.318 47.0 ₁₀	61.141 46.9 ₁₀	63.000 46.7 ₁₀	64.896 46.7 ₁₀	66.831 46.5 ₁₀	68.806 46.4 ₁₀
$K_{\alpha 2}$	43.744 26.7 ₆	45.208 26.8 ₆	46.700 26.9 ₆	48.221 27.0 ₆	49.773 27.2 ₆	51.354 27.2 ₆	52.965 27.3 ₆	54.611 27.3 ₆	56.280 27.3 ₆	57.981 27.4 ₆	59.718 27.4 ₆	61.486 27.4 ₆	63.287 27.4 ₆	65.122 27.4 ₆	66.991 27.5 ₆
$K_{\alpha 3}$	43.288 0.0092 ₃	44.743 0.0102 ₃	46.224 0.0111 ₃	47.734 0.0126 ₄	49.274 0.0135 ₄	50.846 0.0145 ₄	52.443 0.0159 ₅	54.080 0.0173 ₅	55.735 0.0192 ₆	57.425 0.0206 ₆	59.150 0.0224 ₇	60.903 0.0242 ₇	62.693 0.0261 ₈	64.514 0.0298 ₉	66.372 0.0326 ₁₀
$K_{\beta 1}$	50.384 9.44 ₁₉	52.113 9.58 ₂₀	53.877 9.68 ₂₀	55.674 9.77 ₂₀	57.505 9.86 ₂₀	59.383 9.99 ₂₀	61.290 10.1 ₂	63.243 10.20 ₂₁	65.222 10.30 ₂₁	67.244 10.30 ₂₁	69.309 10.40 ₂₁	71.414 10.60 ₂₁	73.560 10.60 ₂₂	75.749 10.70 ₂₂	77.982 10.70 ₂₂
$K_{\beta 2}$	51.698 3.15 ₇	53.476 3.20 ₇	55.293 3.24 ₇	57.142 3.28 ₇	59.028 3.32 ₇	60.962 3.38 ₇	62.929 3.42 ₇	64.942 3.48 ₇	66.982 3.53 ₇	69.067 3.58 ₇	71.195 3.63 ₇	73.363 3.71 ₈	75.575 3.75 ₈	77.831 3.81 ₈	80.130 3.84 ₈
$K_{\beta 3}$	50.228 4.88 ₁₀	51.947 4.95 ₁₀	53.695 5.0 ₁	55.480 5.06 ₁₀	57.300 5.11 ₁₀	59.159 5.18 ₁₀	61.050 5.21 ₁₀	62.985 5.28 ₁₁	64.948 5.32 ₁₁	66.950 5.35 ₁₁	68.995 5.42 ₁₁	71.079 5.48 ₁₁	73.202 5.52 ₁₁	75.368 5.56 ₁₁	77.577 5.57 ₁₁
$K_{\beta 4}$	51.849 0.040 ₂₀	53.634 0.042 ₂₁	55.457 0.045 ₂₂	57.313 0.047 ₂₃	59.210 0.049 ₂₄	61.141 0.051 ₂₅	63.114 0.05 ₃	65.132 0.06 ₃	67.181 0.06 ₃	69.273 0.06 ₃	71.409 0.07 ₃	73.590 0.07 ₃	75.808 0.07 ₃	78.073 0.08 ₄	80.382 0.08 ₄
$K_{\beta 5}$	50.738 0.156 ₆	52.475 0.166 ₇	54.246 0.176 ₇	56.054 0.186 ₈	57.898 0.195 ₈	59.780 0.204 ₈	61.700 0.213 ₉	63.662 0.222 ₉	65.652 0.232 ₉	67.685 0.241 ₁₀	69.760 0.25 ₁	71.875 0.259 ₁₀	74.033 0.268 ₁₁	76.233 0.276 ₁₁	78.476 0.285 ₁₁
$KO_{2,3}$	51.970 0.42 ₄	53.762 0.42 ₄	55.597 0.42 ₄	57.456 0.42 ₄	59.357 0.42 ₄	61.309 0.41 ₄	63.286 0.44 ₅	65.316 0.46 ₅	67.376 0.49 ₅	69.484 0.51 ₅	71.636 0.54 ₆	73.819 0.56 ₆	76.054 0.57 ₆	78.337 0.60 ₆	80.660 0.62 ₆
$L_{\alpha 1}$	6.273 6.7 ₄	6.495 7.1 ₄	6.720 7.4 ₄	6.949 7.7 ₄	7.180 8.1 ₅	7.416 8.3 ₄	7.656 8.6 ₄	7.899 8.9 ₄	8.146 9.3 ₄	8.398 9.7 ₄	8.652 10.1 ₅	8.911 10.4 ₅	9.175 10.9 ₅	9.443 11.2 ₅	9.713 11.6 ₅
$L_{\alpha 2}$	6.239 0.74 ₄	6.458 0.78 ₄	6.680 0.82 ₅	6.905 0.86 ₅	7.133 0.90 ₅	7.367 0.93 ₄	7.605 0.97 ₅	7.844 1.00 ₅	8.088 1.04 ₅	8.335 1.08 ₅	8.586 1.13 ₅	8.840 1.17 ₅	9.099 1.22 ₆	9.362 1.26 ₆	9.628 1.30 ₆
$L_{\beta 1}$	6.977 4.1 ₃	7.248 4.4 ₃	7.526 4.7 ₃	7.811 4.9 ₄	8.102 5.2 ₄	8.402 5.4 ₃	8.709 5.7 ₃	9.023 6.0 ₃	9.343 6.2 ₃	9.672 6.5 ₄	10.010 6.7 ₄	10.354 7.0 ₄	10.708 7.2 ₄	11.071 7.5 ₄	11.443 7.8 ₄
$L_{\beta 2,15}$	7.367 1.38 ₈	7.636 1.45 ₉	7.910 1.49 ₉	8.186 1.55 ₉	8.468 1.59 ₁₀	8.752 1.62 ₈	9.044 1.75 ₉	9.342 1.90 ₁₀	9.646 2.05 ₁₀	9.955 2.19 ₁₁	10.268 2.31 ₁₂	10.590 2.44 ₁₃	10.912 2.57 ₁₃	11.242 2.69 ₁₄	11.576 2.82 ₁₄
$L_{\beta 3}$	7.097 0.127 ₁₉	7.370 0.131 ₂₀	7.653 0.132 ₂₀	7.940 0.133 ₂₀	8.231 0.137 ₂₁	8.537 0.139 ₂₁	8.847 0.144 ₂₂	9.163 0.147 ₂₂	9.488 0.151 ₂₃	9.819 0.159 ₂₄	10.159 0.162 ₂₃	10.511 0.171 ₂₀	10.868 0.178 ₁₈	11.235 0.189 ₁₆	11.610 0.199 ₁₅
$L_{\beta 4}$	6.940 0.078 ₁₂	7.204 0.081 ₁₂	7.471 0.083 ₁₂	7.746 0.085 ₁₃	8.026 0.088 ₁₃	8.313 0.091 ₁₄	8.607 0.096 ₁₅	8.905 0.100 ₁₅	9.213 0.104 ₁₆	9.525 0.112 ₁₇	9.845 0.109 ₁₆	10.176 0.096 ₁₅	10.510 0.088 ₁₃	10.854 0.083 ₁₃	11.205 0.078 ₁₂
$L_{\beta 5}$							9.240 0.0103 ₅	9.554 0.0268 ₁₂	9.875 0.0372 ₁₇	10.201 0.0483 ₂₂	10.532 0.091 ₄	10.871 0.138 ₆	11.211 0.179 ₈	11.562 0.222 ₁₀	11.916 0.268 ₁₂
$L_{\beta 6}$	7.116 0.068 ₄	7.374 0.074 ₄	7.635 0.079 ₄	7.909 0.087 ₅	8.176 0.092 ₅	8.456 0.098 ₅	8.738 0.103 ₅	9.023 0.108 ₅	9.316 0.114 ₅	9.612 0.121 ₆	9.910 0.132 ₆	10.217 0.143 ₇	10.525 0.152 ₇	10.840 0.160 ₇	11.160 0.170 ₈
$L_{\gamma 1}$	8.105 0.71 ₅	8.426 0.76 ₆	8.757 0.82 ₆	9.088 0.88 ₇	9.437 0.93 ₇	9.780 0.99 ₆	10.144 1.04 ₆	10.516 1.10 ₆	10.895 1.16 ₇	11.285 1.22 ₇	11.685 1.29 ₈	12.096 1.35 ₈	12.513 1.41 ₈	12.942 1.47 ₉	13.382 1.56 ₉
$L_{\gamma 2}$	8.398 0.025 ₄	8.714 0.025 ₄	9.051 0.026 ₄	9.385 0.026 ₄	9.730 0.028 ₅	10.090 0.029 ₅	10.460 0.030 ₅	10.834 0.031 ₅	11.217 0.033 ₅	11.608 0.035 ₆	12.009 0.034 ₆	12.421 0.030 ₅	12.841 0.028 ₅	13.273 0.027 ₄	13.709 0.025 ₄
$L_{\gamma 3}$	8.423 0.035 ₆	8.753 0.037 ₆	9.088 0.038 ₆	9.431 0.039 ₆	9.779 0.040 ₇	10.143 0.041 ₇	10.511 0.044 ₇	10.890 0.045 ₇	11.277 0.047 ₈	11.675 0.050 ₈	12.082 0.049 ₈	12.500 0.043 ₇	12.924 0.039 ₆	13.361 0.037 ₆	13.807 0.034 ₆
$L_{\gamma 6}$							10.344 0.0063 ₆	10.733 0.0167 ₁₆	11.130 0.030 ₃	11.538 0.047 ₄	11.955 0.081 ₈	12.385 0.112 ₁₁	12.820 0.145 ₁₄	13.270 0.180 ₁₇	13.731 0.209 ₂₀
L_{η}	6.284 0.095 ₇	6.534 0.099 ₇	6.789 0.103 ₈	7.058 0.106 ₈	7.310 0.110 ₈	7.580 0.114 ₆	7.857 0.119 ₆	8.139 0.124 ₇	8.428 0.130 ₇	8.724 0.136 ₇	9.027 0.142 ₈	9.337 0.148 ₈	9.650 0.155 ₈	9.975 0.163 ₉	10.309 0.172 ₉
L_{ζ}	5.546 0.28 ₃	5.743 0.30 ₃	5.943 0.32 ₃	6.151 0.34 ₃	6.341 0.36 ₃	6.545 0.37 ₃	6.753 0.39 ₄	6.960 0.41 ₄	7.173 0.43 ₄	7.387 0.46 ₄	7.604 0.49 ₄	7.822 0.52 ₅	8.042 0.55 ₅	8.266 0.58 ₅	8.494 0.61 ₆

	⁸⁰ Hg	⁸¹ Tl	⁸² Pb	⁸³ Bi	⁸⁴ Po	⁸⁵ At	⁸⁶ Rn	⁸⁷ Fr	⁸⁸ Ra	⁸⁹ Ac	⁹⁰ Th	⁹¹ Pa	⁹² U	⁹³ Np	⁹⁴ Pu
$K_{\alpha 1}$	70.818 46.3 ₉	72.873 46.3 ₉	74.969 46.2 ₉	77.107 46.2 ₉	79.290 46.1 ₉	81.517 46.1 ₉	83.787 46.0 ₉	86.105 45.8 ₉	88.471 45.7 ₉	90.886 45.5 ₉	93.350 45.4 ₉	95.863 45.3 ₉	98.434 45.1 ₉	101.059 45.1 ₉	103.734 45.1 ₉
$K_{\alpha 2}$	68.894 27.5 ₆	70.832 27.6 ₆	72.805 27.7 ₆	74.815 27.7 ₆	76.863 27.7 ₆	78.948 27.9 ₆	81.069 27.9 ₆	83.231 27.9 ₆	85.431 28.0 ₆	87.675 28.1 ₆	89.957 28.1 ₆	92.282 28.1 ₆	94.654 28.2 ₆	97.069 28.3 ₆	99.525 28.4 ₆
$K_{\alpha 3}$	68.263 0.0358 ₁₁	70.184 0.0395 ₁₂	72.144 0.0428 ₁₃	74.138 0.0474 ₁₄	76.172 0.196 ₆	78.242 0.0571 ₁₇	80.349 0.0616 ₁₉	82.496 0.0675 ₂₀	84.683 0.0732 ₂₂	86.910 0.0791 ₂₄	89.178 0.085 ₃	91.491 0.091 ₃	93.844 0.099 ₃	96.242 0.105 ₃	98.687 0.114 ₃
$K_{\beta 1}$	80.255 10.70 ₂₂	82.574 10.70 ₂₂	84.938 10.70 ₂₂	87.349 10.70 ₂₁	89.807 10.70 ₂₁	92.315 10.70 ₂₁	94.868 10.60 ₂₁	97.474 10.70 ₂₁	100.130 10.70 ₂₁	102.841 10.70 ₂₁	105.604 10.70 ₂₁	108.422 10.70 ₂₂	111.298 10.70 ₂₂	114.234 10.70 ₂₂	117.228 10.70 ₂₂
$K_{\beta 2}$	82.473 3.87 ₈	84.865 3.90 ₈	87.300 3.91 ₈	89.784 3.93 ₈	92.317 3.95 ₈	94.900 3.97 ₈	97.530 3.98 ₈	100.214 4.01 ₈	102.948 4.04 ₈	105.738 4.07 ₈	108.582 4.10 ₈	111.466 4.13 ₈	114.445 4.15 ₈	117.463 4.17 ₈	120.540 4.18 ₈
$K_{\beta 3}$	79.824 5.59 ₁₁	82.115 5.59 ₁₁	84.450 5.58 ₁₁	86.830 5.59 ₁₁	89.256 5.57 ₁₁	91.730 5.58 ₁₁	94.247 5.56 ₁₁	96.815 5.58 ₁₁	99.432 5.59 ₁₁	102.101 5.61 ₁₁	104.819 5.61 ₁₁	107.595 5.64 ₁₁	110.421 5.65 ₁₁	113.303 5.65 ₁₁	116.244 5.44 ₁₁
$K_{\beta 4}$	82.733 0.08 ₄	85.134 0.09 ₄	87.580 0.09 ₄	90.074 0.09 ₄	92.618 0.10 ₅	95.211 0.10 ₅	97.853 0.10 ₅	100.548 0.11 ₅	103.295 0.11 ₅	106.098 0.11 ₅	108.955 0.11 ₅	111.870 0.12 ₆	114.844 0.12 ₆	117.876 0.12 ₆	120.969 0.13 ₆
$K_{\beta 5}$	80.762 0.294 ₁₂	83.093 0.303 ₁₂	85.470 0.312 ₁₂	87.892 0.321 ₁₃	90.363 0.330 ₁₃	92.883 0.339 ₁₄	95.449 0.349 ₁₄	98.069 0.358 ₁₄	100.738 0.362 ₁₅	103.462 0.371 ₁₅	106.239 0.380 ₁₅	109.072 0.389 ₁₆	111.9		

Table 7a. X-ray Energies and Intensities (per 100 K-Shell Vacancies) (continued)

	⁸⁰ Hg	⁸¹ Tl	⁸² Pb	⁸³ Bi	⁸⁴ Po	⁸⁵ At	⁸⁶ Rn	⁸⁷ Fr	⁸⁸ Ra	⁸⁹ Ac	⁹⁰ Th	⁹¹ Pa	⁹² U	⁹³ Np	⁹⁴ Pu
continued															
$L_{\beta 2,15}$	11.915 2.94 ₁₃	12.261 3.06 ₁₃	12.611 3.18 ₁₄	12.967 3.28 ₁₄	13.328 3.40 ₁₅	13.694 3.52 ₁₅	14.066 3.65 ₁₆	14.443 3.74 ₁₆	14.825 3.86 ₁₇	15.212 3.97 ₁₇	15.605 4.09 ₂₁	16.008 4.27 ₂₂	16.410 4.45 ₂₃	16.817 4.59 ₂₄	17.235 4.77 ₂₅
$L_{\beta 3}$	11.992 0.097 ₁₅	12.390 0.094 ₁₄	12.794 0.095 ₁₄	13.211 0.096 ₁₅	13.635 0.107 ₁₆	14.073 0.101 ₁₅	14.519 0.106 ₁₆	14.978 0.106 ₁₆	15.447 0.110 ₁₇	15.931 0.111 ₁₇	16.426 0.116 ₂₀	16.931 0.113 ₁₉	17.454 0.122 ₂₁	17.992 0.124 ₂₁	18.541 0.135 ₂₃
$L_{\beta 4}$	11.561 0.077 ₁₂	11.931 0.077 ₁₂	12.307 0.080 ₁₂	12.691 0.083 ₁₃	13.084 0.095 ₁₄	13.488 0.092 ₁₄	13.898 0.099 ₁₅	14.319 0.102 ₁₅	14.749 0.109 ₁₆	15.191 0.113 ₁₇	15.641 0.122 ₂₁	16.104 0.121 ₂₁	16.577 0.134 ₂₃	17.061 0.140 ₂₄	17.557 0.16 ₃
$L_{\beta 5}$	12.275 0.315 ₁₂	12.643 0.362 ₁₃	13.015 0.411 ₁₅	13.393 0.458 ₁₇	13.778 0.506 ₁₉	14.168 0.556 ₂₁	14.565 0.605 ₂₃	14.967 0.683 ₂₅	15.375 0.71 ₃	15.790 0.76 ₃	16.209 0.81 ₄	16.639 0.87 ₄	17.069 0.94 ₄	17.505 1.17 ₆	17.950 1.06 ₅
$L_{\beta 6}$	11.481 0.180 ₇	11.812 0.190 ₇	12.142 0.200 ₈	12.480 0.210 ₈	12.823 0.220 ₈	13.169 0.230 ₉	13.520 0.239 ₉	13.877 0.251 ₉	14.236 0.263 ₁₀	14.601 0.273 ₁₀	14.970 0.284 ₁₃	15.350 0.300 ₁₄	15.727 0.318 ₁₅	16.109 0.333 ₁₆	16.498 0.349 ₁₇
$L_{\gamma 1}$	13.830 1.63 ₁₀	14.291 1.71 ₁₀	14.765 1.78 ₁₀	15.248 1.87 ₁₁	15.742 1.95 ₁₁	16.249 2.05 ₁₂	16.770 2.15 ₁₃	17.302 2.25 ₁₃	17.848 2.34 ₁₄	18.405 2.42 ₁₄	18.980 2.5 ₃	19.571 2.5 ₃	20.169 2.5 ₃	20.784 2.5 ₃	21.420 2.5 ₃
$L_{\gamma 2}$	14.158 0.025 ₄	14.625 0.026 ₄	15.097 0.027 ₄	15.582 0.029 ₅	16.077 0.033 ₅	16.585 0.033 ₅	17.104 0.036 ₆	17.635 0.038 ₆	18.177 0.041 ₇	18.734 0.044 ₇	19.304 0.048 ₉	19.888 0.048 ₉	20.487 0.055 ₁₀	21.099 0.059 ₁₁	21.724 0.067 ₁₂
$L_{\gamma 3}$	14.262 0.034 ₆	14.738 0.033 ₅	15.216 0.034 ₆	15.709 0.035 ₆	16.213 0.040 ₆	16.731 0.038 ₆	17.258 0.040 ₇	17.800 0.041 ₇	18.353 0.044 ₇	18.922 0.045 ₇	19.505 0.048 ₉	20.101 0.047 ₉	20.715 0.052 ₉	21.342 0.054 ₁₀	21.981 0.059 ₁₁
$L_{\gamma 6}$	14.199 0.248 ₂₃	14.683 0.28 ₃	15.178 0.31 ₃	15.685 0.34 ₃	16.203 0.38 ₄	16.735 0.41 ₄	17.280 0.44 ₄	17.839 0.47 ₄	18.412 0.50 ₅	18.997 0.52 ₅	19.599 0.54 ₇	20.217 0.53 ₇	20.844 0.53 ₇	21.491 0.53 ₇	22.153 0.53 ₇
L_{η}	10.647 0.180 ₁₀	10.994 0.188 ₁₀	11.349 0.196 ₁₁	11.712 0.207 ₁₁	12.085 0.218 ₁₂	12.466 0.228 ₁₂	12.855 0.238 ₁₃	13.255 0.247 ₁₃	13.662 0.255 ₁₄	14.082 0.266 ₁₄	14.511 0.28 ₃	14.953 0.28 ₃	15.400 0.27 ₃	15.861 0.28 ₃	16.333 0.28 ₃
L_{ζ}	8.722 0.65 ₆	8.953 0.68 ₆	9.184 0.72 ₆	9.420 0.75 ₇	9.658 0.79 ₇	9.897 0.82 ₇	10.137 0.86 ₇	10.381 0.89 ₈	10.622 0.93 ₈	10.871 0.98 ₈	11.118 1.02 ₉	11.372 1.08 ₁₀	11.620 1.14 ₁₀	11.871 1.20 ₁₁	12.124 1.25 ₁₁
	⁹⁵ Am	⁹⁶ Cm	⁹⁷ Bk	⁹⁸ Cf	⁹⁹ Es	¹⁰⁰ Fm	¹⁰¹ Md	¹⁰² No	¹⁰³ Lr	¹⁰⁴ Rf					
$K_{\alpha 1}$	106.472 44.9 ₉	109.271 44.8 ₉	112.121 44.6 ₉	115.032 44.4 ₉	118.012 44.3 ₉	121.058 44.2 ₉	125.170 44.1 ₉	127.357 44.0 ₉	130.611 43.8 ₉	133.381 43.6 ₉					
$K_{\alpha 2}$	102.030 28.5 ₆	104.590 28.5 ₆	107.185 28.7 ₆	109.831 28.7 ₆	112.531 28.8 ₆	115.285 28.9 ₆	119.088 29.0 ₆	120.953 29.0 ₆	123.867 29.1 ₆	126.302 29.2 ₆					
$K_{\alpha 3}$	101.174 0.123 ₄	103.715 0.132 ₄	106.300 0.145 ₄	108.929 0.158 ₅	111.614 0.171 ₅	114.352 0.184 ₆	118.139 0.201 ₆	119.987 0.218 ₇	122.887 0.235 ₇	125.407 0.252 ₈					
$K_{\beta 1}$	120.284 10.70 ₂₁	123.403 10.60 ₂₁	126.580 10.70 ₂₁	129.823 10.70 ₂₂	133.137 10.70 ₂₂	136.521 10.80 ₂₂	140.974 10.70 ₂₂	143.506 10.70 ₂₂	147.110 10.80 ₂₂	150.279 10.80 ₂₂					
$K_{\beta 2}$	123.680 4.19 ₈	126.889 4.19 ₈	130.152 4.22 ₉	133.483 4.26 ₉	136.887 4.27 ₉	140.362 4.31 ₉	144.906 4.30 ₉	147.531 4.32 ₉	151.227 4.35 ₉	154.494 4.36 ₉					
$K_{\beta 3}$	119.243 5.64 ₁₁	122.304 5.63 ₁₁	125.418 5.67 ₁₁	128.594 5.70 ₁₁	131.838 5.71 ₁₁	135.150 5.74 ₁₂	139.525 5.73 ₁₂	141.977 5.75 ₁₂	145.496 5.78 ₁₂	148.550 5.79 ₁₂					
$K_{\beta 4}$	124.127 0.13 ₆	127.352 0.13 ₆	130.630 0.14 ₇	133.979 0.14 ₇	137.399 0.15 ₇	140.892 0.15 ₇	145.456 0.15 ₇	148.100 0.15 ₇	151.818 0.16 ₈	155.097 0.16 ₈					
$K_{\beta 5}$	120.989 0.421 ₁₇	124.124 0.429 ₁₇	127.316 0.437 ₁₈	130.573 0.449 ₁₈	133.904 0.454 ₁₈	137.304 0.457 ₁₈	141.774 0.465 ₁₉	144.323 0.472 ₁₉	147.944 0.479 ₁₉	151.113 0.486 ₁₉					
$KO_{2,3}$	124.723 1.0 ₁	127.970 1.02 ₁₀	131.274 1.04 ₁₁	134.646 1.05 ₁₁	138.090 1.06 ₁₁	141.608 1.08 ₁₁	146.195 1.09 ₁₁	148.865 1.10 ₁₁	152.607 1.12 ₁₁	155.904 1.13 ₁₂					
$KP_{2,3}$	124.955 0.158 ₁₆	128.210 0.169 ₁₇	131.524 0.170 ₁₇	134.908 0.162 ₁₇	138.363 0.163 ₁₇	141.889 0.163 ₁₇	146.490 0.164 ₁₇	149.171 0.165 ₁₇	152.926 0.174 ₁₈	156.236 0.183 ₁₉					
$L_{\alpha 1}$	14.620 18.2 ₉	14.961 18.5 ₉	15.308 18.8 ₉	15.660 19.0 ₉	16.016 19.2 ₉	16.377 19.4 ₁₁	16.741 19.6 ₁₁	17.110 19.7 ₁₁	17.483 19.8 ₁₁	17.893 19.8 ₁₁					
$L_{\alpha 2}$	14.414 2.04 ₁₀	14.746 2.08 ₁₀	15.082 2.1 ₁	15.423 2.12 ₁₀	15.767 2.15 ₁₀	16.116 2.17 ₁₃	16.467 2.19 ₁₃	16.823 2.20 ₁₃	17.183 2.22 ₁₃	17.571 2.22 ₁₃					
$L_{\beta 1}$	18.856 10.4 ₁₁	19.427 10.6 ₁₁	20.018 10.7 ₁₁	20.624 10.8 ₁₁	21.248 11.0 ₁₁	21.889 11.2 ₁₁	22.549 11.4 ₁₂	23.227 11.5 ₁₂	23.927 11.7 ₁₂	24.650 12.0 ₁₂					
$L_{\beta 2,15}$	17.655 4.9 ₃	18.081 5.0 ₃	18.509 5.1 ₃	18.946 5.2 ₃	19.387 5.3 ₃	19.834 5.3 ₃	20.286 5.4 ₃	20.744 5.5 ₃	21.207 5.5 ₄	21.716 5.6 ₄					
$L_{\beta 3}$	19.110 0.137 ₂₄	19.688 0.142 ₂₄	20.280 0.142 ₂₄	20.894 0.145 ₂₅	21.523 0.15 ₃	22.169 0.15 ₃	22.835 0.15 ₃	23.519 0.15 ₃	24.223 0.15 ₃	24.872 0.15 ₃					
$L_{\beta 4}$	18.069 0.16 ₃	18.589 0.17 ₃	19.118 0.18 ₃	19.665 0.19 ₃	20.224 0.21 ₄	20.798 0.21 ₄	21.386 0.23 ₅	21.990 0.24 ₅	22.609 0.24 ₅	23.143 0.26 ₅					
$L_{\beta 5}$	18.399 1.11 ₅	18.853 1.16 ₆	19.312 1.19 ₆	19.777 1.23 ₆	20.249 1.26 ₆	20.727 1.29 ₈	21.210 1.32 ₈	21.700 1.35 ₈	22.195 1.38 ₈	22.727 1.41 ₈					
$L_{\beta 6}$	16.890 0.361 ₁₇	17.286 0.373 ₁₈	17.687 0.385 ₁₈	18.094 0.396 ₁₉	18.501 0.407 ₁₉	18.916 0.419 ₂₄	19.332 0.430 ₂₅	19.754 0.44 ₃	20.179 0.45 ₃	20.670 0.46 ₃					
$L_{\gamma 1}$	22.072 2.6 ₃	22.735 2.7 ₃	23.416 2.7 ₃	24.117 2.8 ₃	24.836 2.8 ₃	25.574 2.9 ₃	26.333 3.0 ₃	27.110 3.1 ₃	27.911 3.1 ₃	28.753 3.2 ₃					
$L_{\gamma 2}$	22.370 0.073 ₁₃	23.028 0.079 ₁₄	23.698 0.082 ₁₅	24.390 0.087 ₁₆	25.099 0.093 ₁₇	25.825 0.096 ₂₀	26.571 0.102 ₂₁	27.336 0.109 ₂₃	28.120 0.109 ₂₃	28.846 0.116 ₂₄					
$L_{\gamma 3}$	22.643 0.062 ₁₁	23.319 0.065 ₁₂	24.007 0.065 ₁₂	24.718 0.068 ₁₂	25.446 0.071 ₁₃	26.195 0.071 ₁₅	26.963 0.073 ₁₅	27.752 0.075 ₁₆	28.560 0.074 ₁₅	29.327 0.076 ₁₆					
$L_{\gamma 6}$	22.836 0.54 ₇	23.527 0.55 ₇	24.241 0.57 ₇	24.971 0.59 ₈	25.723 0.60 ₈	26.492 0.63 ₈	27.284 0.65 ₈	28.094 0.68 ₉	28.929 0.70 ₉	29.796 0.73 ₉					
L_{η}	16.819 0.28 ₃	17.314 0.29 ₃	17.826 0.30 ₃	18.347 0.30 ₃	18.884 0.31 ₃	19.433 0.31 ₃	19.998 0.32 ₃	20.577 0.33 ₃	21.173 0.34 ₃	21.825 0.35 ₄					
L_{ζ}	12.377 1.31 ₁₂	12.633 1.36 ₁₂	12.890 1.40 ₁₃	13.146 1.45 ₁₃	13.403 1.49 ₁₄	13.660 1.53 ₁₅	13.916 1.57 ₁₅	14.173 1.61 ₁₆	14.429 1.64 ₁₆	14.746 1.68 ₁₆					