

X-ray lines and edges in eV

main lines only

Element	K series						L1-series				L2 series				L3 series			Miv series	M series	Mv series	Z								
	K edge	Kb3	Kb1	Kb2	Ka1	Ka2	L1 edge	Lg3	Lb3	Lb4	L2 edge	Lg1	Lb1	Ln	L3 edge	Lb2	La1	La2	L1	Miv edge		Mb	Mv edge	Ma1	Ma2	Mg	Mz1	Mz2	
H	13.6																											1	
He	24.6																												2
Li	54.7				54.3																							3	
Be	111.5				108.5																							4	
Be	188.0				183.3																							5	
C	284.2				277.0																							6	
N	409.9				392.4																							7	
O	543.1				524.9																							8	
F	696.7				676.8																							9	
Ne	866.9	857.9	857.9		848.6	848.6	53.0																					10	
Na	1071.7	1071.1	1071.1		1041.0	1041.0	75.2																					11	
Mg	1303.4	1302.2	1302.2		1253.7	1253.4	62.8				49.7					49.5												12	
Al	1559.9	1557.6	1557.6		1486.7	1486.3	87.0					122.3	72.8			69.5	72.8			69.1								13	
Si	1840.1	1836.0	1836.0		1740.0	1739.4	163.7						100.8			95.3	100.8											14	
P	2143.5	2139.1	2139.1		2013.7	2012.7	199.8						131.9			123.0	131.9											15	
S	2470.5	2469.7	2464.1		2307.9	2306.7	239.2						174.7			148.7	172.9											16	
Cl	2819.6	2815.6	2815.6		2622.4	2620.8	281.8						211.5			184.1	209.1											17	
Ar	3202.9	3190.5	3190.5		2957.7	2955.6	327.3						251.6			221.8	249.5											18	
K	3607.8	3589.6	3589.6		3313.9	3311.2	386.3						294.5			262.5	294.5											19	
Ca	4038.1	4012.8	4012.8		3691.7	3688.1	450.5						352.9			306.4	349.3						341.3	341.3				20	
Sc	4488.9	4460.4	4460.4		4090.7	4086.0	510.1						416.3			352.9	411.5						395.5	395.5				21	
Ti	4964.6	4931.8	4931.8		4510.9	4504.9	573.3						454.3			401.4	454.3						452.2	452.2				22	
V	5463.8	5427.3	5427.3		4952.2	4944.7	639.8						534.7			453.5	526.5						511.3	511.3				23	
Cr	5989.0	5946.8	5946.8		5414.8	5405.5	742.4						692.6			510.2	598.9						572.9	572.9				24	
Mn	6537.7	6490.6	6490.6		5898.8	5887.7	782.9						665.9			567.4	654.0						637.4	637.4				25	
Fe	7110.7	7058.2	7058.2		6404.0	6391.0	859.8						720.7			627.8	707.5						704.8	704.8				26	
Co	7708.8	7649.4	7649.4		6930.4	6915.5	940.2						793.8			693.8	779.0						776.3	776.3				27	
Ni	8331.5	8264.8	8264.8		7478.3	7461.0	1024.1						870.5			762.0	853.6						851.5	851.5				28	
Cu	8980.5	8905.4	8905.4		8047.8	8027.8	1103.1						952.7			832.1	933.0						929.7	929.7				29	
Zn	9660.8	9572.0	9572.0	9658.1	8638.9	8615.8	949.3						1045.2			906.3	1022.0						1011.8	1011.8				30	
Ga	10368.1	10260.3	10264.2	10366.4	9251.7	9224.8	1302.7						1145.0			984.2	1117.0						1098.0	1098.0				31	
Ge	11103.8	10978.1	10982.2	11101.0	9886.5	9855.4	1413.2						1249.3			1068.0	1217.1						1188.0	1188.0				32	
As	11864.3	11719.9	11725.7	11864.3	10543.3	10507.5	1529.3	1529.7	1388.5	1388.5			1358.7			1317.0	1155.0						1282.0	1282.0				33	
Se	12654.6	12489.7	12496.0	12652.3	11222.5	11181.5	1652.4	1651.6	1490.0	1490.0			1474.8			1419.2	1244.6						1379.1	1379.1				34	
Br	13470.5	13284.7	13291.6	13469.6	11924.4	11877.8	1781.6	1778.8	1596.3	1596.3			1599.2			1525.9	1339.6						1480.5	1480.5				35	
Kr	14324.6	14105.0	14112.8	14315.0	12648.0	12595.4	1916.3	1911.5	1706.8	1697.5			1729.7			1636.9	1439.4						1585.4	1585.4				36	
Rb	15202.5	14951.9	14961.4	15185.5	13395.5	13335.9	2063.6	2050.7	1826.6	1817.7			1866.1			1752.2	1541.8						1694.1	1692.6				37	
Sr	16107.2	15825.2	15835.9	16084.7	14165.2	14098.0	2217.1	2196.5	1947.2	1936.4			2008.5			1871.7	1649.3						1806.6	1804.8				38	
Y	17036.6	16725.9	16738.1	17015.6	14958.5	14882.9	2376.5	2346.8	2072.2	2060.0			2154.0	2157.9	1995.9	1761.0	2079.5						1922.6	1920.5				39	
Zr	17995.9	17652.6	17666.6	17970.3	15774.9	15690.6	2541.1	2502.9	2201.1	2187.7			2305.4	2302.7	2124.4	1876.6	2222.3	2219.4					2042.5	2040.2				40	
Nb	18983.0	18606.5	18622.7	18952.9	16615.2	16521.3	2710.0	2663.9	2334.8	2319.4			2464.4	2461.9	2257.4	1996.2	2370.6	2367.0					2165.9	2163.0				41	
Mo	20000.4	19590.3	19608.3	19965.3	17479.4	17374.3	2880.6	2830.7	2473.1	2455.7			2627.3	2623.5	2394.8	2120.3	2523.6	2518.3					2293.2	2289.9				42	
Tc	21047.5	20599.2	20619.0	21005.4	18367.2	18250.9	3055.3	3002.2	2614.9	2595.6			2794.9	2791.4	2536.8	2249.9	2677.8	2675.5					2424.0	2420.2				43	
Ru	22119.6	21634.7	21656.8	22074.3	19279.2	19150.5	3232.9	3180.9	2763.4	2741.2			2966.1	2964.5	2683.3	2382.0	2837.8	2836.0					2558.6	2554.3				44	
Rh	23222.0	22698.8	22723.6	23173.0	20216.1	20073.7	3416.4	3364.1	2915.7	2890.8			3144.8	3143.8	2834.4	2519.1	3002.1	3001.3					2696.8	2692.1				45	
Pd	24352.6	23791.1	23818.7	24299.4	21177.1	21020.2	3607.3	3553.3	3073.0	3045.4			3330.4	3328.7	2990.3	2660.3	3173.0	3171.8					2838.6	2833.3				46	
Ag	25515.6	24911.5	24942.4	25456.7	22162.9	21990.3	3807.3	3749.8	3234.5	3203.5			3525.8	3519.6	3151.0	2806.1	3351.0	3347.8					2984.3	2978.2				47	
Cd	26713.3	26061.3	26095.4	26644.1	23174.0	22984.1	4019.0	3949.0	3401.5	3367.2			3728.0	3716.9	3316.6	2956.8	3537.6	3528.2					3133.8	3127.0				48	
In	27940.4	27237.5	27275.6	27861.2	24209.8	24002.0	4237.3	4160.5	3573.1	3535.3			3939.3	3920.8	3487.2	3112.6	3730.3	3713.8					3287.0	3279.3				49	
Sn	29200.4	28444.4	28486.3	29109.6	25271.4	25044.0	4464.8	4376.8	3750.4	3708.3			4157.3	4131.2	3662.8	3272.4	3928.8	3904.9					3444.0	3437.4				50	

Element	K series						L1-series				L2 series				L3 series				Miv series	M series	Mv series				Z				
	K edge	Kb3	Kb1	Kb2	Ka1	Ka2	L1 edge	Lg3	Lb3	Lb4	L2 edge	Lg1	Lb1	Ln	L3 edge	Lb2	La1	La2	L1	Miv edge	Mb	Mv edge	Ma1	Ma2		Mg	Mz1	Mz2	
Sb	30490.5	29679.2	29725.5	30389.8	26358.9	26110.8	4698.4	4600.0	3932.7	3886.4	4381.9	4347.8	3843.6	3436.7	4132.3	4100.8	3604.8	3595.4	3188.6										51
Te	31811.5	30944.6	30996.0	31700.8	27472.6	27202.0	4939.7	4829.1	4120.5	4069.5	4612.6	4570.9	4029.6	3605.9	4341.9	4301.7	3769.4	3758.8	3335.6										52
I	33167.2	32239.7	32295.1	33041.7	28612.3	28317.5	5191.9	5065.7	4313.5	4257.5	4854.1	4801.0	4220.8	3780.2	4558.8	4507.6	3937.7	3926.1	3485.1										53
Xe	34593.0	33563.2	33624.2	34414.7	29778.8	29458.3	5452.9	5306.7	4512.0	4450.3	5103.8	5037.0	4417.7	3958.4	4782.2	4718.9	4110.1	4097.4	3638.0										54
Cs	35988.0	34919.7	34987.3	35821.7	30973.1	30625.4	5720.6	5552.8	4716.9	4649.5	5358.2	5280.3	4619.8	4142.1	5011.4	4936.0	4286.5	4272.3	3795.0										55
Ba	37452.4	36303.4	36377.4	37257.7	32193.3	31816.6	5995.9	5810.1	4927.0	4852.0	5623.3	5531.2	4827.6	4331.0	5247.0	5156.6	4466.3	4450.9	3954.2										56
La	38934.3	37720.6	37801.5	38730.3	33442.1	33034.4	6268.1	6075.3	5143.4	5061.8	5889.1	5788.3	5042.2	4524.9	5483.5	5382.9	4651.0	4634.3	4124.5		854.0		833.0		1027.0	638.0		57	
Ce	40453.6	39170.5	39257.8	40233.1	34720.0	34279.3	6548.1	6342.0	5365.3	5277.4	6160.9	6052.2	5262.9	4731.6	5724.0	5612.7	4840.1	4823.2	4287.5		902.0		883.0		1074.9	676.0		58	
Pr	42002.0	40653.3	40748.7	41774.4	36026.7	35550.6	6834.4	6615.9	5591.8	5498.1	6439.0	6322.1	5488.9	4935.6	5963.3	5849.9	5033.8	5013.6	4453.2		950.0		929.2		1127.3	714.0		59	
Nd	43574.0	42166.2	42270.9	43335.0	37360.7	36847.5	7129.5	6900.4	5827.8	5721.6	6723.6	6601.2	5721.4	5145.3	6209.4	6091.3	5230.2	5207.7	4631.8		997.0		978.0		1180.0	753.0		60	
Pm	45198.0	43712.7	43825.5	44937.0	38725.1	38171.6	7435.7	7189.3	6071.3	5955.2	7014.2	6892.1	5961.5	5363.0	6460.4	6338.9	5432.6	5407.9	4810.0										61
Sm	46849.0	45288.6	45413.0	46575.0	40118.5	39523.4	7747.9	7486.8	6316.4	6196.2	7313.3	7178.1	6204.1	5585.6	6717.4	6587.2	5636.0	5609.1	4990.4		1099.8		1081.0		1291.0	831.0		62	
Eu	48519.7	46904.0	47038.4	48256.6	41542.6	40902.3	8060.8	7794.1	6571.6	6437.8	7619.8	7479.1	6455.7	5816.7	6980.6	6841.8	5846.5	5816.6	5177.2		1153.3	1125.8	1131.0		1346.0	872.0		63	
Gd	50233.9	48555.8	48696.9	49960.6	42996.7	42309.3	8386.3	8105.0	6831.0	6687.3	7931.3	7785.9	6713.4	6049.7	7243.2	7103.0	6057.4	6025.0	5362.1		1209.1		1185.0		1402.0	914.0		64	
Tb	52003.8	50229.8	50382.9	51724.0	44482.8	43744.6	8717.0	8423.9	7096.1	6940.3	8252.8	8101.8	6977.8	6284.0	7515.5	7366.7	6272.8	6238.1	5546.8		1266.1		1240.0		1461.0	955.0		65	
Dy	53793.1	51958.1	52119.7	53510.0	45998.9	45208.3	9055.1	8753.3	7370.2	7204.0	8583.1	8418.9	7247.8	6534.2	7789.8	7635.8	6495.3	6457.7	5743.1		1325.0		1293.0		1522.0	998.0		66	
Ho	55619.9	53711.3	53877.1	55325.0	47547.1	46700.0	9399.7	9087.6	7651.8	7471.1	8916.4	8747.2	7525.7	6786.9	8067.6	7911.4	6719.7	6678.5	5940.0		1383.0		1348.0		1576.0	1045.0		67	
Er	57485.2	55479.7	55673.5	57214.0	49127.2	48221.6	9757.8	9431.2	7939.0	7744.8	9262.1	9088.9	7810.2	7045.2	8357.4	8189.1	6947.9	6904.5	6138.9		1443.0		1406.0		1643.0	1090.0		68	
Tm	59379.0	57303.0	57508.8	59095.0	50741.5	49772.7	10121.0	9779.3	8230.9	8025.8	9617.0	9426.2	8102.3	7309.3	8649.5	8468.7	7180.1	7133.7	6342.0		1503.0	1406.9	1462.0					69	
Yb	61305.0	59152.0	59367.1	60985.0	52389.5	51354.6	10491.0	10143.2	8536.8	8313.3	9976.0	9780.2	8401.9	7580.2	8944.0	8758.9	7415.7	7367.4	6545.5		1567.5		1521.4		1765.0	1183.0		70	
Lu	63305.0	61048.0	61283.0	62967.0	54070.4	52965.6	10873.7	10511.2	8847.0	8606.5	10344.8	10143.5	8709.1	7857.4	9249.0	9049.0	7655.6	7604.9	6752.9		1631.2		1581.3		1832.0			71	
Hf	65316.0	62980.0	63234.0	64980.0	55790.8	54612.0	11268.6	10890.8	9163.5	8905.5	10735.9	10515.9	9022.8	8139.3	9558.3	9347.4	7899.1	7844.7	6959.6		1697.6		1644.6		1895.0	1280.0	1280.0	72	
Ta	67403.7	64949.6	65223.3	66949.4	57533.2	56277.6	11682.1	11277.7	9487.6	9212.5	11132.5	10895.3	9343.2	8428.1	9876.7	9651.9	8146.2	8087.9	7173.2	1804.0	1765.5	1743.0	1709.6		1964.0	1330.8	1328.8	73	
W	69508.5	66952.2	67245.0	69032.5	59318.8	57981.8	12099.7	11680.5	9818.9	9525.2	11538.6	11286.0	9672.6	8724.4	10200.1	9964.1	8398.2	8335.3	7387.8	1880.0	1834.9	1814.0	1775.4	1773.1	2035.0	1383.5	1378.7	74	
Re	71657.8	68995.2	69310.3	71152.0	61141.0	59718.6	12531.1	12082.5	10159.9	9846.4	11954.7	11685.5	10010.0	9027.3	10531.1	10275.4	8652.6	8586.3	7603.7	1958.0	1906.1	1890.0	1842.5		2106.7	1436.8	1431.0	75	
Os	73856.2	71078.1	71413.9	73318.9	63001.1	61487.3	12971.6	12500.0	10511.0	10175.5	12380.9	12095.5	10355.4	9337.1	10868.0	10598.7	8911.8	8841.1	7822.3	2042.0	1978.3	1967.0	1910.2		2182.0	1491.9	1483.1	76	
Ir	76100.1	73203.4	73561.7	75529.9	64896.2	63287.3	13423.8	12924.1	10867.5	10510.7	12820.0	12512.7	10708.4	9652.3	11212.0	10920.5	9175.2	9099.6	8045.9	2126.0	2053.5	2048.0	1979.9	1975.8	2254.0	1545.8	1537.3	77	
Pt	78380.5	75368.7	75749.1	77785.5	66832.9	65123.3	13880.7	13361.5	11230.9	10854.4	13271.9	12942.2	11070.8	9975.2	11562.8	11250.7	9442.4	9362.0	8268.2	2217.0	2127.3	2133.0	2050.5	2047.0	2331.0	1602.2	1592.0	78	
Au	80721.3	77575.0	77979.8	80076.0	68804.5	66990.7	14355.3	13809.1	11610.5	11204.8	13734.2	13381.8	11442.5	10308.4	11919.7	11584.8	9713.4	9628.1	8494.0	2307.0	2204.6	2220.0	2122.9	2118.0	2410.0	1660.5	1648.0	79	
Hg	83109.2	79823.3	80254.2	82435.0	70819.5	68895.1	14842.8	14264.8	11995.4	11563.1	14214.9	13830.2	11822.7	10651.4	12286.4	11924.2	9988.9	9897.7	8721.3		2282.5		2313.0	2195.3		2478.5		80	
Tl	85534.5	82118.4	82576.7	84838.0	72872.5	70832.5	15342.4	14737.0	12390.6	11930.8	14700.3	14291.6	12213.4	10994.4	12660.3	12271.7	10268.6	10172.9	8953.3	2504.0	2362.1	2406.0	2270.6	2265.6	2571.0	1778.0	1763.0	81	
Pb	88005.6	84450.5	84939.1	87238.0	74970.1	72805.4	15858.0	15218.2	12793.4	12305.9	15199.0	14764.6	12613.8	11349.4	13035.1	12622.8	10551.6	10449.6	9184.6	2606.0	2442.7	2502.0	2345.5	2339.7	2652.7	1839.5	1823.0	82	
Bi	90537.7	86835.7	87344.1	89731.7	77109.2	74816.2	16376.0	15710.5	13210.0	12691.4	15719.8	15247.9	13023.7	11712.4	13426.7	12980.0	10838.9	10731.1	9420.4	2711.0	2525.5	2603.0	2422.6	2417.0	2735.0	1901.0	1883.0	83	
Po	93109.9	89247.0	89797.0	92262.0	79292.9	76864.4	16936.0	16212.9	13637.9	13085.2	16245.8	15744.2	13447.1	12084.7	13818.7	13340.5	11130.9	11016.0	9664.2									84	
At	95733.5	91723.0	92304.0	94846.0	81514.0	78944.0	17489.7	16729.1	14067.3	13486.1	16785.0	16251.7	13876.2	12465.3	14216.0	13708.4	11426.9	11304.9	9896.4									85	
Rn	98408.1	94247.0	94867.0	97478.0	83783.0	81066.0	18056.8	17257.8	14511.7	13897.5	17337.4	16770.7	14315.8	12855.1	14619.5	14080.3	11727.1	11598.1	10137.2									86	
Fr	101141.2	96808.0	97478.0	100155.0	86105.0	83232.0	18642.4	17799.3	14975.7	14318.5	17907.9	17303.4	14770.4	13254.0	15033.8	14450.0	12031.4	11895.1	10379.8									87	
Ra	103927.7	99434.0	100136.0	102861.0	88476.0	85436.0	19237.0	18357.4	15445.1	14747.3	18485.5	17848.7	15235.9	13663.2	15443.7	14841.6	12339.9	12196.3	10622.3									88	
Ac	106768.2	102102.0	102847.0	105679.0	90884.8	87676.0	19855.2	18922.8	15931.5	15190.3	19090.0	18408.4	15713.3	14080.7	15879.5	15230.4	12652.2	12501.0	10870.1									89	
Th	109649.0	104816.5	105601.5	108509.0	93347.4	89957.0	20462.5	19503.4	16423.9	15639.5	19682.9	18978.3	16201.6	14510.3	16298.5	15624.0	12967.9	12809.5	11118.1	3485.0	3145.8	3325.0	2996.1	2987.0	3370.0	2364.0	2322.0	90	
Pa	112601.7	107585.3	108417.3	111405.0	95866.4	92283.4	21113.7	20097.6	16930.5	16103.7	20318.1	195																	