

Algumas Configurações Electrónicas

				<i>1s</i>	<i>2s</i>	<i>2p</i>	<i>3s</i>		
¹ H	1s ¹			↑					
² He	1s ²			↑↓					
³ Li	1s ²	2s ¹		↑↓	↑				
⁴ Be	1s ²	2s ²		↑↓	↑↓				
⁵ B	1s ²	2s ²	2p ¹	↑↓	↑↓	↑			
⁶ C	1s ²	2s ²	2p ²	↑↓	↑↓	↑ ↑			
⁷ N	1s ²	2s ²	2p ³	↑↓	↑↓	↑ ↑ ↑			
⁸ O	1s ²	2s ²	2p ⁴	↑↓	↑↓	↑↓ ↑ ↑			
⁹ F	1s ²	2s ²	2p ⁵	↑↓	↑↓	↑↓ ↑↓ ↑			
¹⁰ Ne	1s ²	2s ²	2p ⁶	↑↓	↑↓	↑↓ ↑↓ ↑↓			
¹¹ Na	1s ²	2s ²	2p ⁶	3s ¹	↑↓	↑↓	↑↓ ↑↓ ↑↓	↑	

TABELA PERIÓDICA DOS ELEMENTOS

Grupos:

1	2	3	4	5	6	7	8	9	10	1	12	13	14	15	16	17	18
IA	IIA	IIIA	IVA	VA	VIA	VIIA	VIIIA	VIIIA	VIIIA	IB	IIB	IIIB	IVB	VB	VIB	VII B	VIII B

Períodos:

1	H 1s ¹																He 1s ²	
2	Li 1s ² 2s ¹	Be 1s ² 2s ²										B 1s ² 2s ² 2p ¹	C 1s ² 2s ² 2p ²	N 1s ² 2s ² 2p ³	O 1s ² 2s ² 2p ⁴	F 1s ² 2s ² 2p ⁵	Ne 1s ² 2s ² 2p ⁶	
3	Na [Ne]3s ¹	Mg [Ne]3s ²										Al [Ne]3s ² 3p ¹	Si [Ne]3s ² 3p ²	P [Ne]3s ² 3p ³	S [Ne]3s ² 3p ⁴	Cl [Ne]3s ² 3p ⁵	Ar [Ne]3s ² 3p ⁶	
4	K [Ar]4s ¹	Ca [Ar]4s ²	Sc [Ar]3d ¹ 4s ²	Ti [Ar]3d ² 4s ²	V [Ar]3d ³ 4s ²	Cr [Ar]3d ⁵ 4s ¹	Mn [Ar]3d ⁵ 4s ²	Fe [Ar]3d ⁶ 4s ²	Co [Ar]3d ⁷ 4s ²	Ni [Ar]3d ⁸ 4s ²	Cu [Ar]3d ¹⁰ 4s ¹	Zn [Ar]3d ¹⁰ 4s ²	Ga [Ar]4s ² 4p ¹	Ge [Ar]4s ² 4p ²	As [Ar]4s ² 4p ³	Se [Ar]4s ² 4p ⁴	Br [Ar]4s ² 4p ⁵	Kr [Ar]4s ² 4p ⁶
5	Rb [Kr]5s ¹	Sr [Kr]5s ²	Y [Kr]4d ¹ 5s ²	Zr [Kr]4d ² 5s ²	Nb [Kr]4d ⁴ 5s ¹	Mo [Kr]4d ⁵ 5s ¹	Tc [Kr]4d ⁵ 5s ²	Ru [Kr]4d ⁷ 5s ¹	Rh [Kr]4d ⁸ 5s ¹	Pd [Kr]4d ¹⁰ 5s ⁰	Ag [Kr]4d ¹⁰ 5s ¹	Cd [Kr]4d ¹⁰ 5s ²	In [Kr]5s ² 5p ¹	Sn [Kr]5s ² 5p ²	Sb [Kr]5s ² 5p ³	Te [Kr]5s ² 5p ⁴	I [Kr]5s ² 5p ⁵	Xe [Kr]5s ² 5p ⁶
6	Cs [Xe]6s ¹	Ba [Xe]6s ²	La [Xe]5d ¹ 6s ²	Hf [Xe]5d ² 6s ²	Ta [Xe]5d ⁴ 6s ²	W [Xe]5d ⁴ 6s ²	Re [Xe]5d ⁵ 6s ²	Os [Xe]5d ⁶ 6s ²	Ir [Xe]5d ⁷ 6s ²	Pt [Xe]5d ⁹ 6s ¹	Au [Xe]5d ¹⁰ 6s ¹	Hg [Xe]5d ¹⁰ 6s ²	Tl [Xe]6s ² 6p ¹	Pb [Xe]6s ² 6p ²	Bi [Xe]6s ² 6p ³	Po [Xe]6s ² 6p ⁴	At [Xe]6s ² 6p ⁵	Rn [Xe]6s ² 6p ⁶
7	Fr [Rn]7s ¹	Ra [Rn]7s ²	Ac [Rn]6d ¹ 7s ²	Rf [Rn]6d ² 7s ²	Db [Rn]6d ³ 7s ²	Sg [Rn]6d ⁴ 7s ²	Bh [Rn]6d ⁵ 7s ²	Hs [Rn]6d ⁶ 7s ²	Mt [Rn]6d ⁷ 7s ²	Ds [Rn]6d ⁸ 7s ²	Rg [Rn]6d ⁹ 7s ²	Uub [Rn]6d ¹⁰ 7s ²	Uut [Rn]7s ² 7p ¹	Uuq [Rn]7s ² 7p ²	Uup [Rn]7s ² 7p ³	Uuh [Rn]7s ² 7p ⁴	Uus [Rn]7s ² 7p ⁵	Uuo [Rn]7s ² 7p ⁶

- Hidrogénio
- Metais alcalinos
- Metais alcalino-terrosos
- Metais de transição
- Metalóides
- Não metais
- Gases raros
- Terras raras

6	58	59	60	61	62	63	64	65	66	67	68	69	70	71
	Ce	Pr	Nd	Pm	Sm	Eu	Gd	Tb	Dy	Ho	Er	Tm	Yb	Lu
	[Xe]4f ¹ 5d ¹ 6s ²													
7	90	91	92	93	94	95	96	97	98	99	100	101	102	103
	Th	Pa	U	Np	Pu	Am	Cm	Bk	Cf	Es	Fm	Md	No	Lr
	[Rn]6d ² 7s ²													
	[Xe]4f ¹⁴ 5d ¹ 6s ²													
	[Rn]5f ¹⁴ 6d ¹ 7s ²													

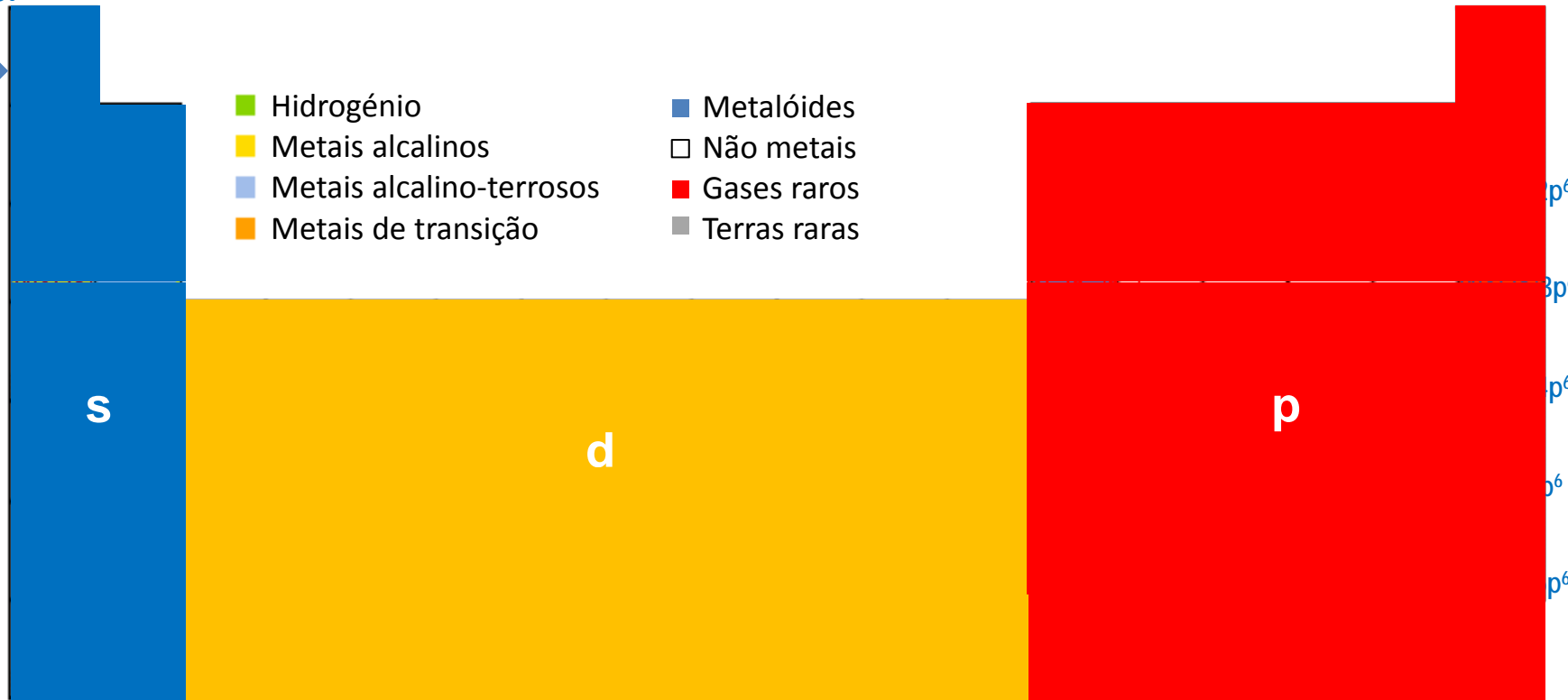
TABELA PERIÓDICA DOS ELEMENTOS

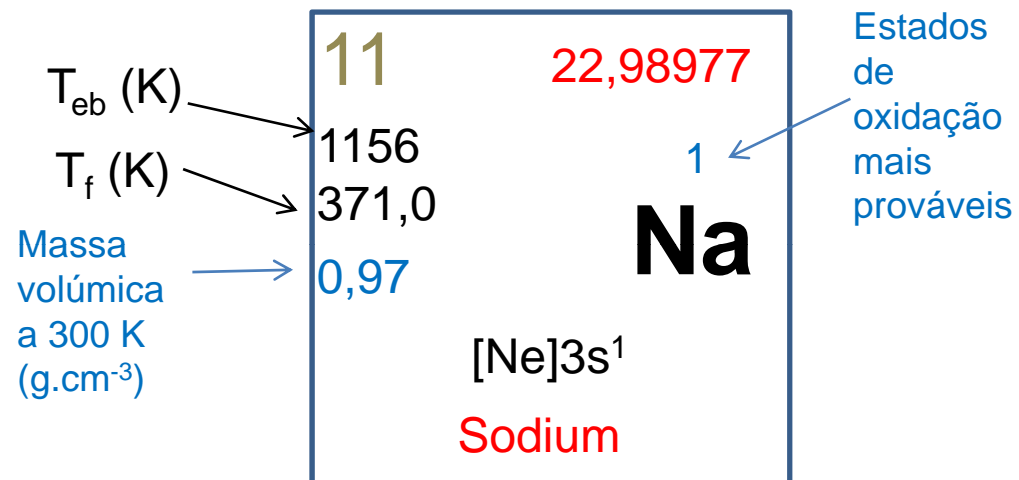
Grupos:

1	2	3	4	5	6	7	8	9	10	1	12	13	14	15	16	17	18
IA	IIA	IIIA	IVA	VA	VIA	VIIA	VIIIA	VIIIA	VIIIA	IB	IIB	IIIB	IVB	VB	VIB	VII B	VIII B

Períodos:

1
2
3
4
5
6
7





PROPRIEDADES PERIÓDICAS DOS ELEMENTOS

Z_{ef} - Número Atómico Efectivo sobre o electrão mais exterior

r - Raio Atómico

E_i - Energia de Ionização

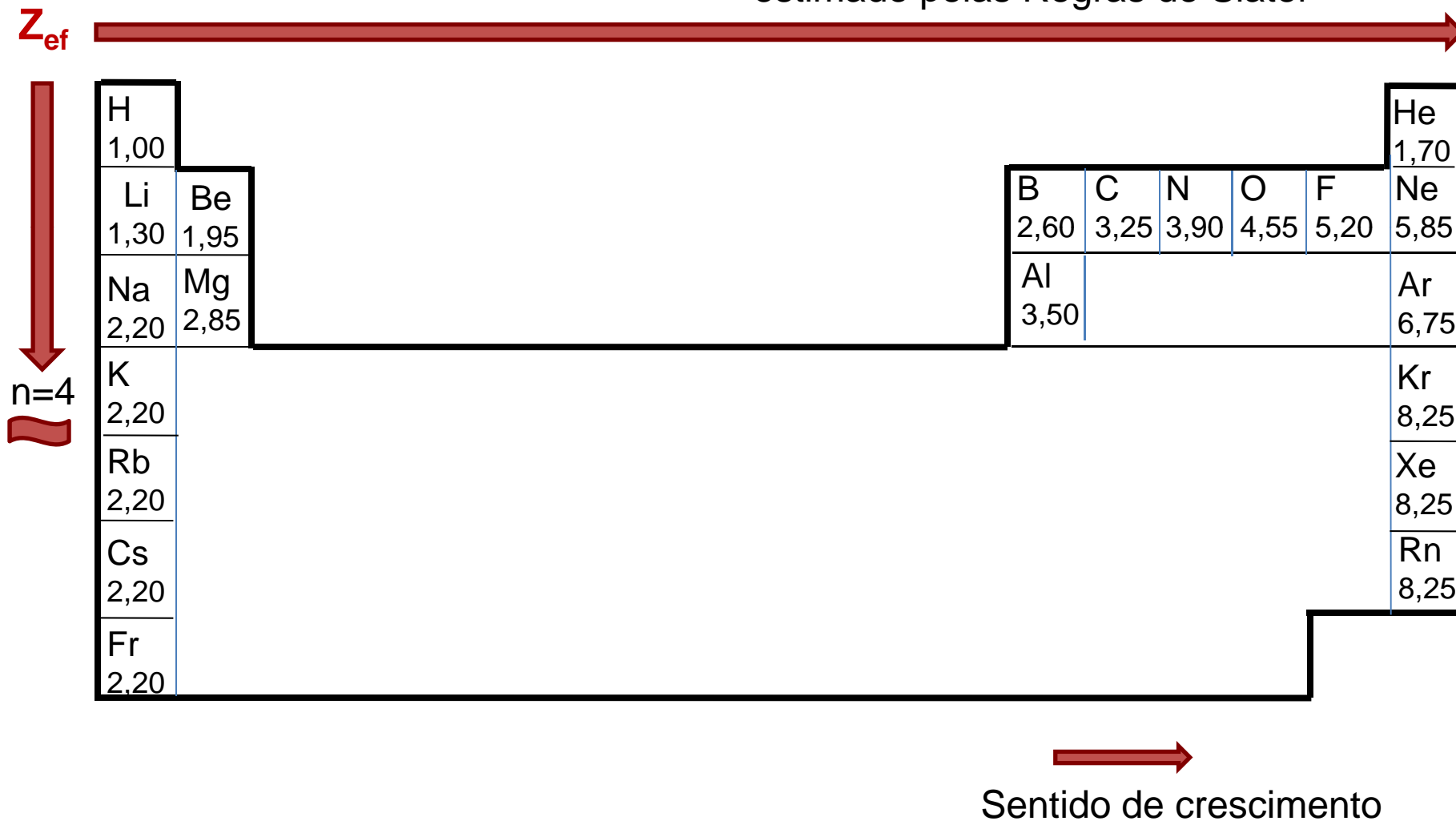
E_a - Afinidade electrónica

χ - Electronegatividade

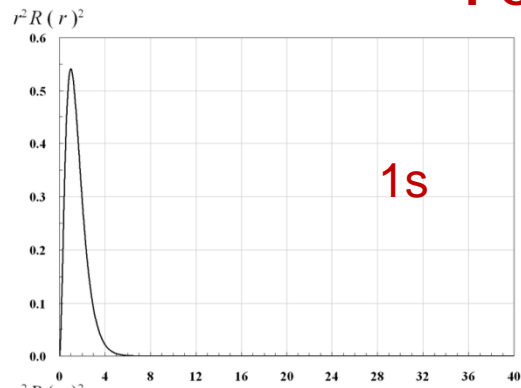
Número Atómico Efectivo - Z_{ef}

$$Z_{ef} = Z - S$$

estimado pelas Regras de Slater

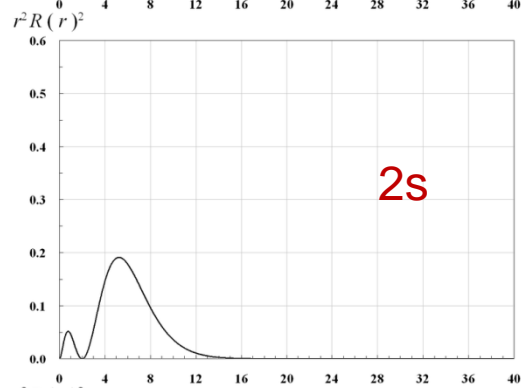


Penetrabilidade das orbitais

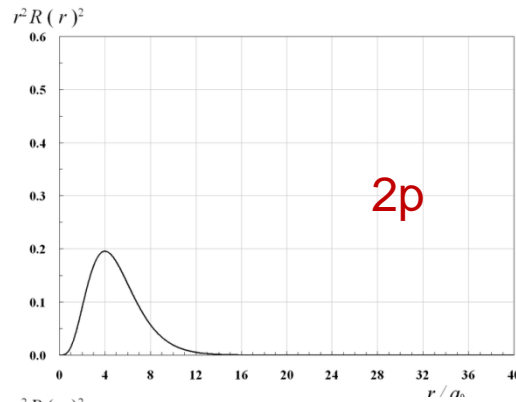


1s

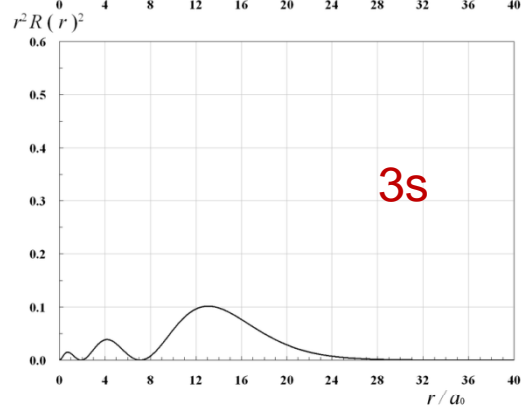
Função de Probabilidade radial: $4\pi r^2 R^2(r) dr$



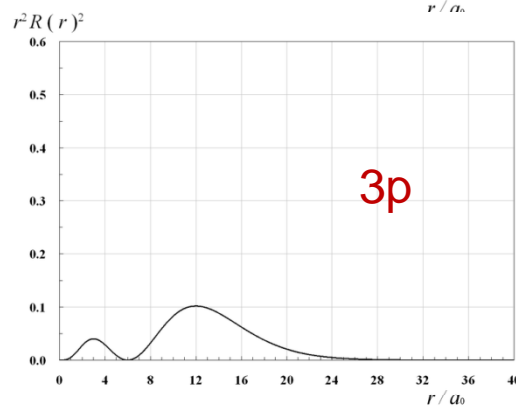
2s



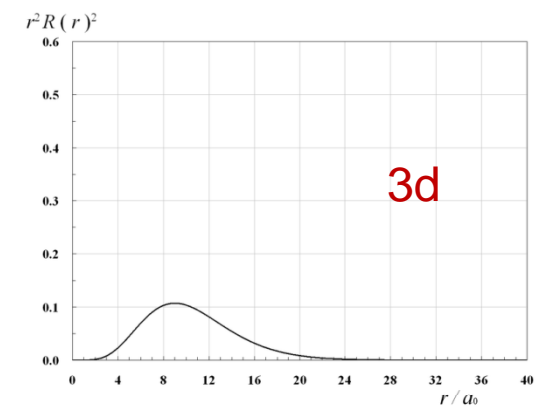
2p



3s



3p

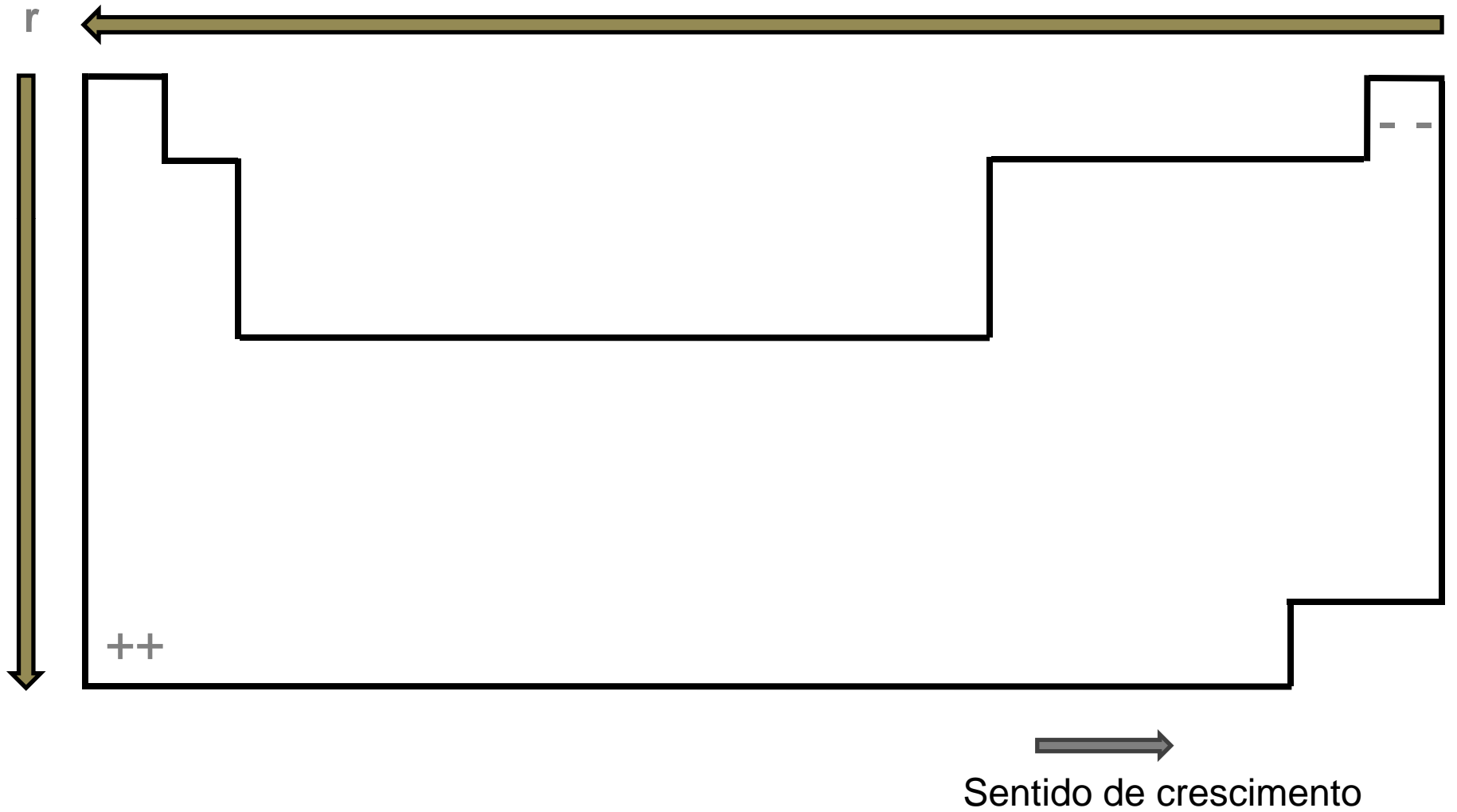


3d

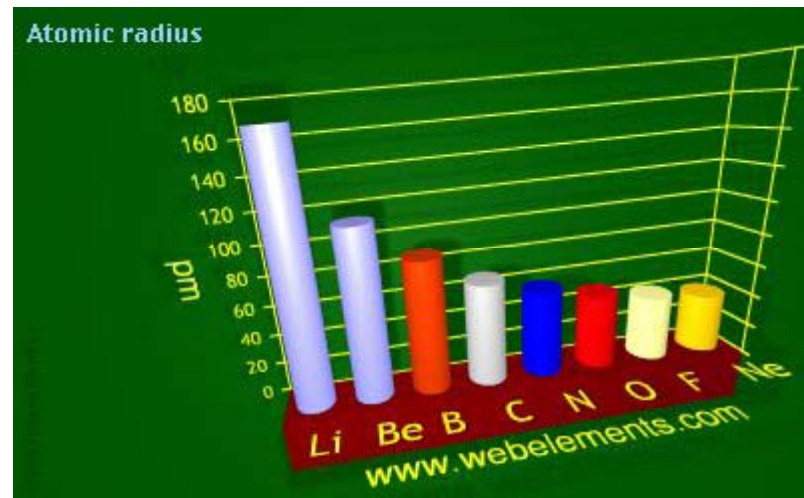
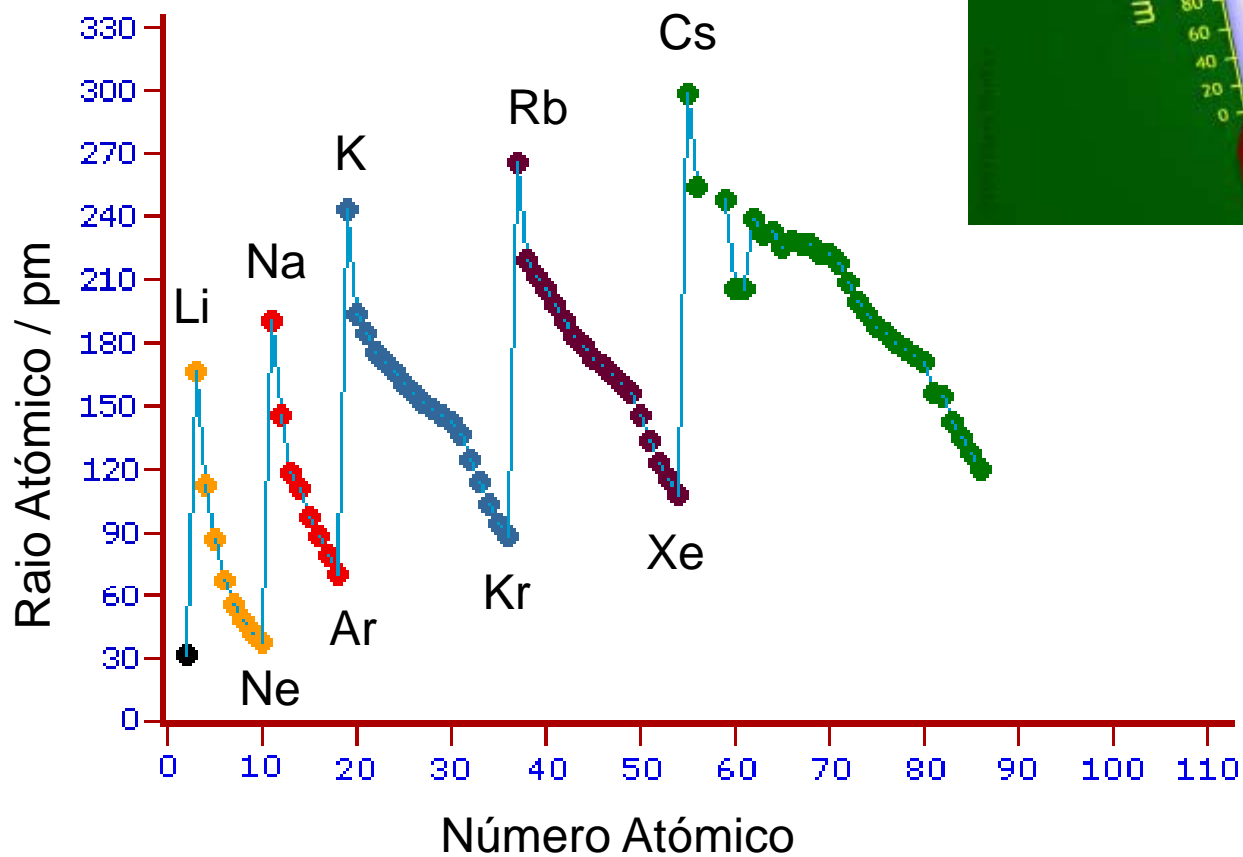
As orbitais 3s são mais *penetrantes* que as 3p e estas mais que as 3d

Raio Atômico - r

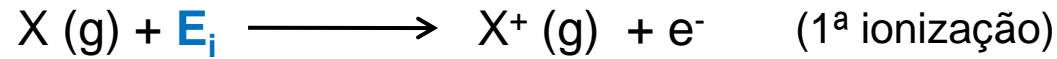
$$r = \text{Constante} \times \frac{n^2}{Z_{\text{ef}}}$$



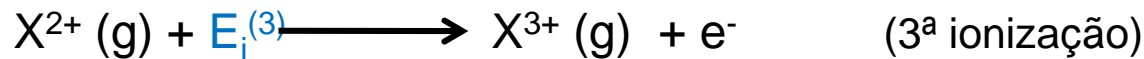
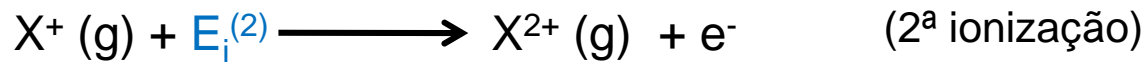
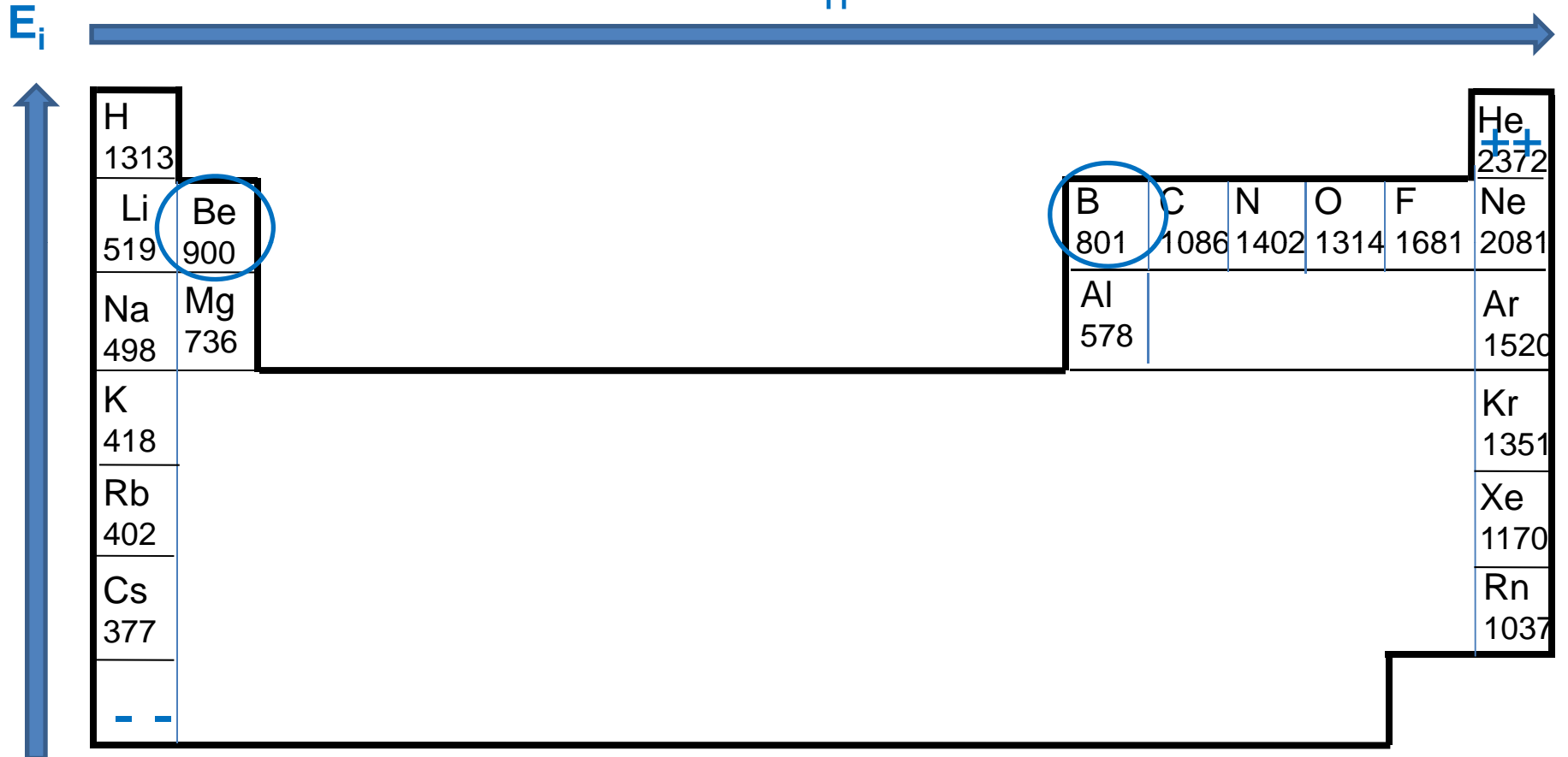
r em função do Número Atômico




Energia de Ionização

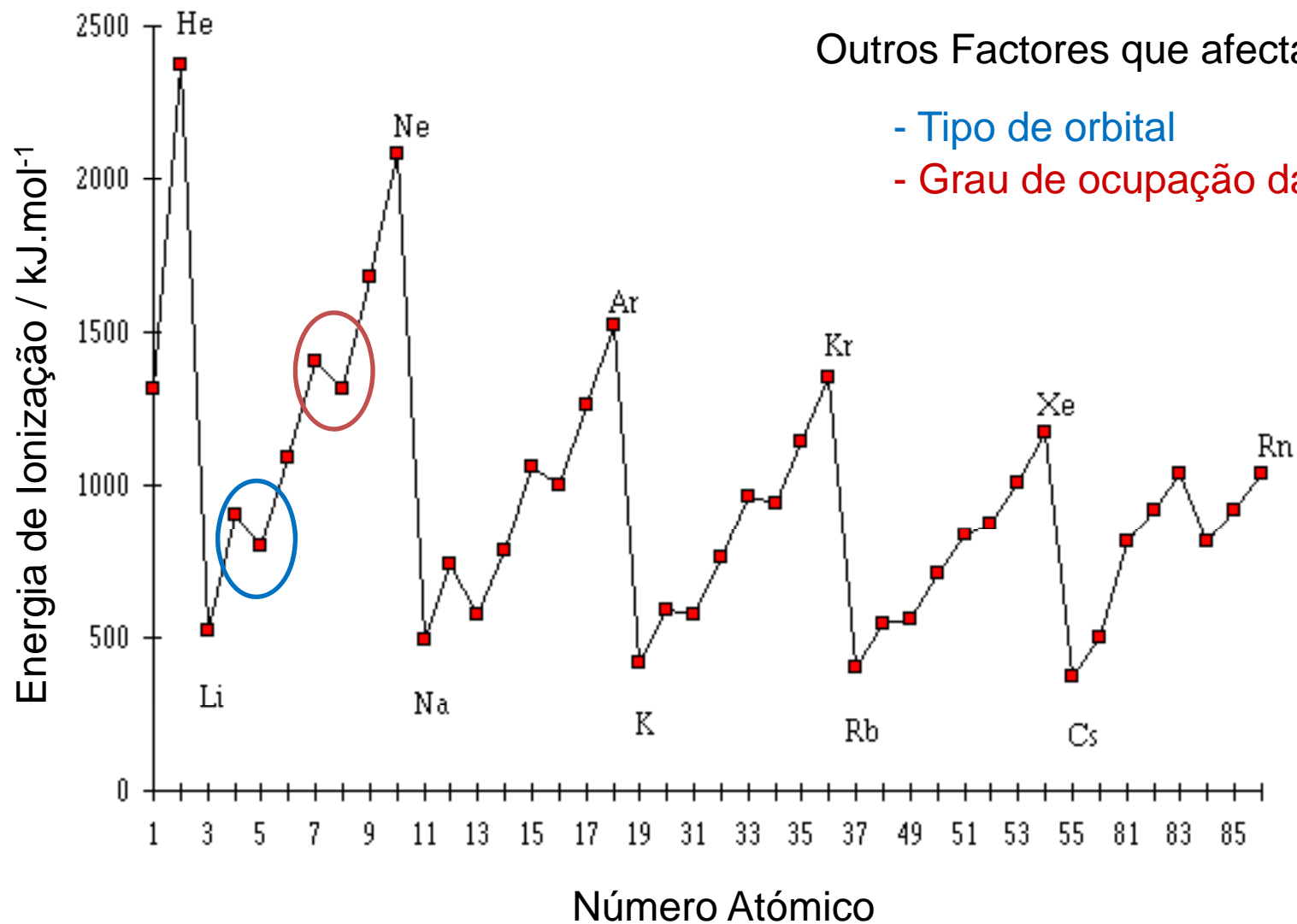


$$E_i = \text{Constante} \times \frac{Z_{\text{ef}}^2}{n^2}$$



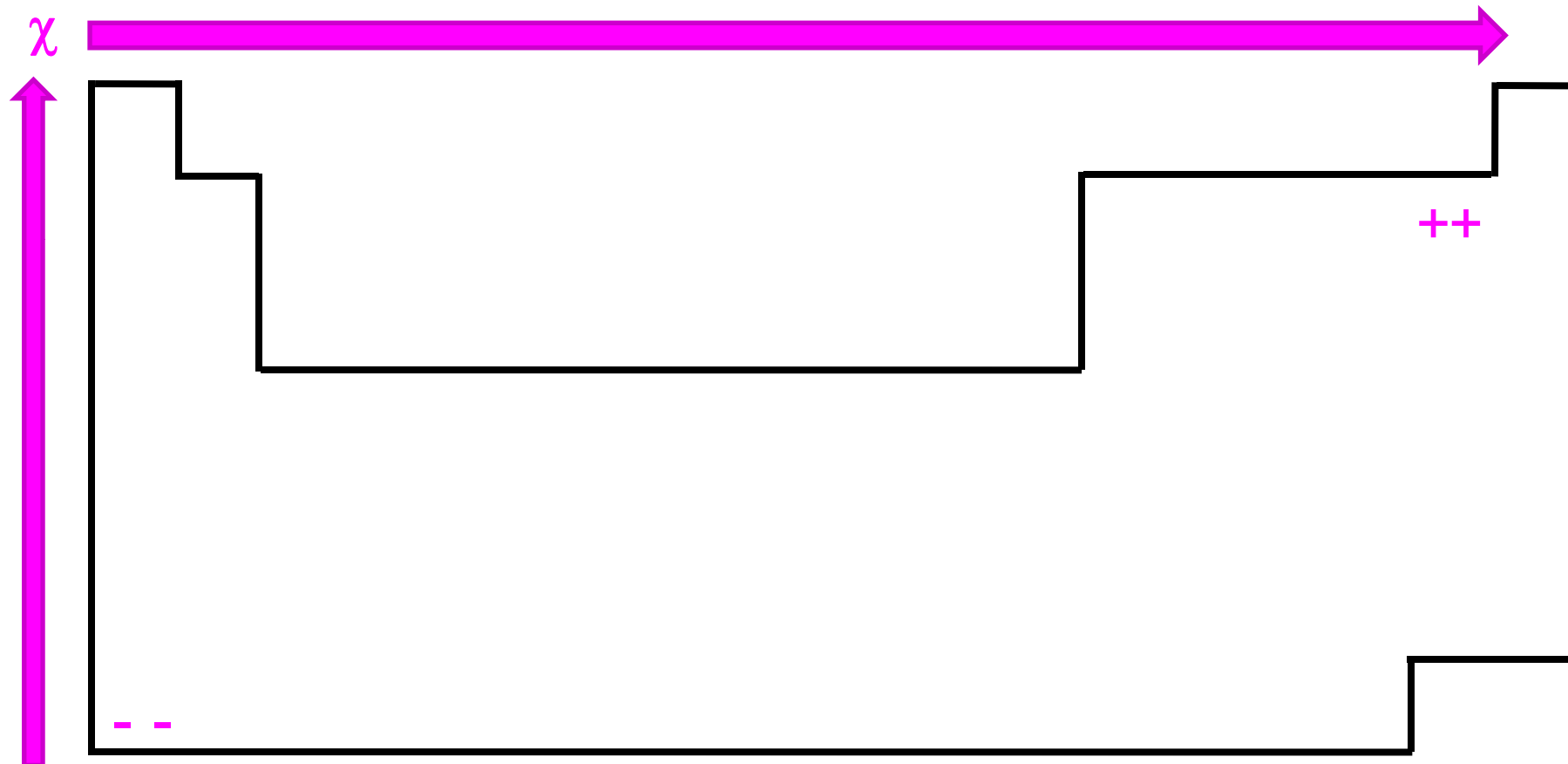

 Sentido de crescimento

E_i em função do Número Atômico



Electronegatividade- χ

$$\chi(\mathbf{X}) = \text{Constante} \times \frac{E_i(\mathbf{X}) + E_a(\mathbf{X})}{2} \quad (\text{Mulliken})$$



Periodic Table of the Elements

Electronegativity

<http://chemistry.about.com>

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About Chemistry

1A												3A					4A	5A	6A	7A	8A
1 H 2.20												5 B 2.04	6 C 2.55	7 N 3.04	8 O 3.44	9 F 3.98	2 He no data				
3 Li 0.98	4 Be 1.57											13 Al 1.61	14 Si 1.90	15 P 2.19	16 S 2.58	17 Cl 3.16	10 Ne no data				
11 Na 0.93	12 Mg 1.31	3B	4B	5B	6B	7B	8B		1B	2B	18 Ar no data										
19 K 0.82	20 Ca 1.00	21 Sc 1.36	22 Ti 1.54	23 V 1.63	24 Cr 1.66	25 Mn 1.55	26 Fe 1.83	27 Co 1.88	28 Ni 1.91	29 Cu 1.90	30 Zn 1.65	31 Ga 1.81	32 Ge 2.01	33 As 2.18	34 Se 2.55	35 Br 2.96	36 Kr 3.00				
37 Rb 0.82	38 Sr 0.95	39 Y 1.22	40 Zr 1.33	41 Nb 1.6	42 Mo 2.16	43 Tc 1.9	44 Ru 2.2	45 Rh 2.28	46 Pd 2.20	47 Ag 1.93	48 Cd 1.69	49 In 1.78	50 Sn 1.96	51 Sb 2.05	52 Te 2.1	53 I 2.66	54 Xe 2.6				
55 Cs 0.79	56 Ba 0.89	57-71 Lanthanides	72 Hf 1.3	73 Ta 1.5	74 W 2.36	75 Re 1.9	76 Os 2.2	77 Ir 2.20	78 Pt 2.28	79 Au 2.54	80 Hg 2.00	81 Tl 1.62	82 Pb 2.33	83 Bi 2.02	84 Po 2.0	85 At 2.2	86 Rn no data				
87 Fr 0.7	88 Ra 0.89	89-103 Actinides	*** Elements > 104 exist only for very short half-lives and the data is unknown.***																		

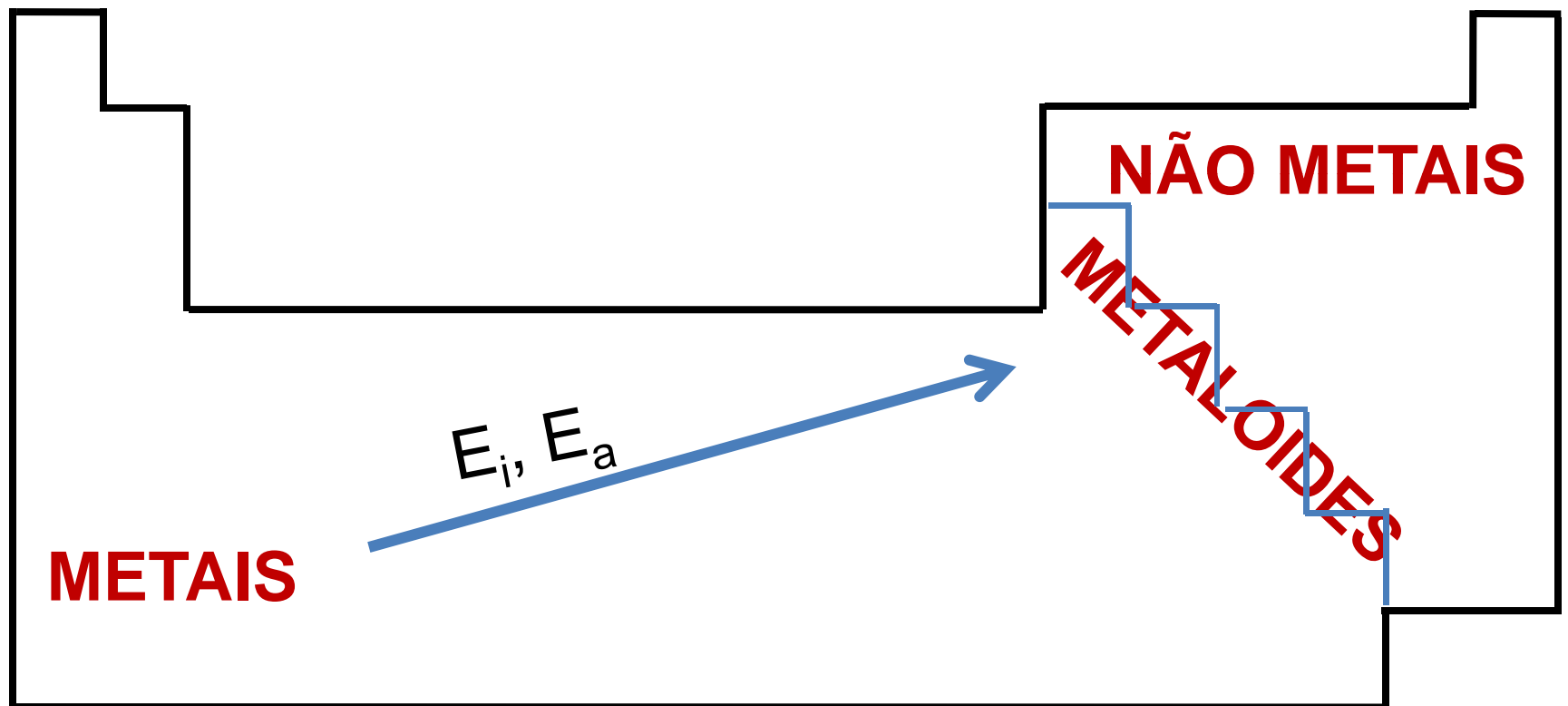


Lanthanides

57 La 1.10	58 Ce 1.12	59 Pr 1.13	60 Nd 1.14	61 Pm 1.13	62 Sm 1.17	63 Eu 1.2	64 Gd 1.2	65 Tb 1.2	66 Dy 1.22	67 Ho 1.23	68 Er 1.24	69 Tm 1.25	70 Yb 1.1	71 Lu 1.27
89 Ac 1.1	90 Th 1.3	91 Pa 1.5	92 U 1.38	93 Np 1.36	94 Pu 1.28	95 Am 1.3	96 Cm 1.3	97 Bk 1.3	98 Cf 1.3	99 Es 1.3	100 Fm 1.3	101 Md 1.3	102 No 1.3	103 Lr no data

Actinides

Carácter dos Elementos



Sumário 4

Propriedades Periódicas dos Elementos

- Tabela Periódica
- Número Atómico Efectivo sobre o electrão mais exterior (Z_{ef})
- Raio Atómico, factores de que depende
- Energia de Ionização, factores de que depende
- Afinidade Electrónica
- Electronegatividade
- Variação das Propriedades periódicas ao longo de um período e de um grupo da Tabela periódica
- Consequências das propriedades atómicas na ligação química