

start  
4/2/15

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$\bar{e}$  configuration diagrams

$\uparrow$  represent 1 orbital

1  $\downarrow$  use 1 arrow per  $\bar{e}$

d subshell    — — — — —

p subshell    — — —

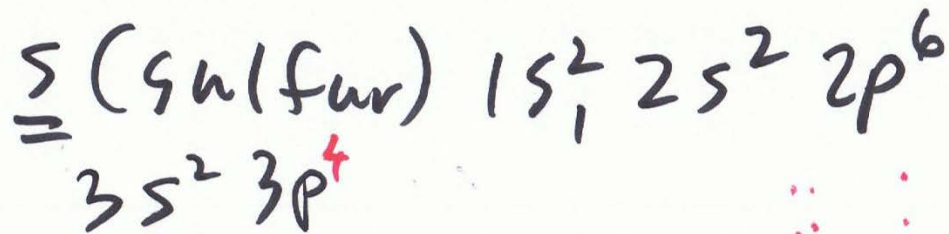
# Periodic Table of the Elements

IA												VIIA + VIII							
1												1		2					
H												He		He					
1.00794												1.00794		4.002602					
2	Li	3	4											5	6	7	8		
6.941	2e											10.811	12.0107	14.00674	15.9994	18.9984032	20.1797		
3	Na	11	12											13	14	15	16	17	18
22.989770	Ne	22.989770	24.3050											26.981538	28.0855	30.973761	32.066	35.4527	39.948
4	K	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36
39.0983	Ca	39.0983	40.078	44.955910	47.867	50.9415	51.9961	54.938049	55.845	58.933200	58.933200	63.546	65.39	69.723	72.61	74.92160	78.96	79.90	83.80
5	Rb	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54
85.4678	Sr	85.4678	87.62	88.9058	91.224	92.90638	95.94	(98)	101.07	102.90550	106.42	107.8682	112.411	114.818	118.710	121.760	127.60	126.90447	131.29
6	Cs	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72
132.90545	Ba	132.90545	137.327	138.9055	178.49	180.9479	183.84	186.207	190.23	192.217	195.078	196.96655	200.59	204.3833	207.2	208.98038	(209)	(210)	(222)
7	Fr	87	88	89	90	91	92	93	94	95	96	97	98	99	100	101	102	103	104
(223)	Ra	(223)	(226)	(227)	(261)	(262)	(263)	(262)	(265)	(266)	(269)	(272)	(277)	(289)	(287)	(289)	(289)	(293)	(293)

$(4-1=3)$   
3d

Br 2

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
140.116	140.90765	144.24	(145)	150.36	151.964	157.25	158.92534	162.50	164.93032	167.26	168.93421	173.04	174.967
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
232.0381	231.03588	238.0289	(237)	(244)	(243)	(247)	(247)	(251)	(252)	(257)	(258)	(259)	(262)



e configuration diagram (S)

# Periodic Table of the Elements P

*e* config of  $\sum$  redo on 4/2/15

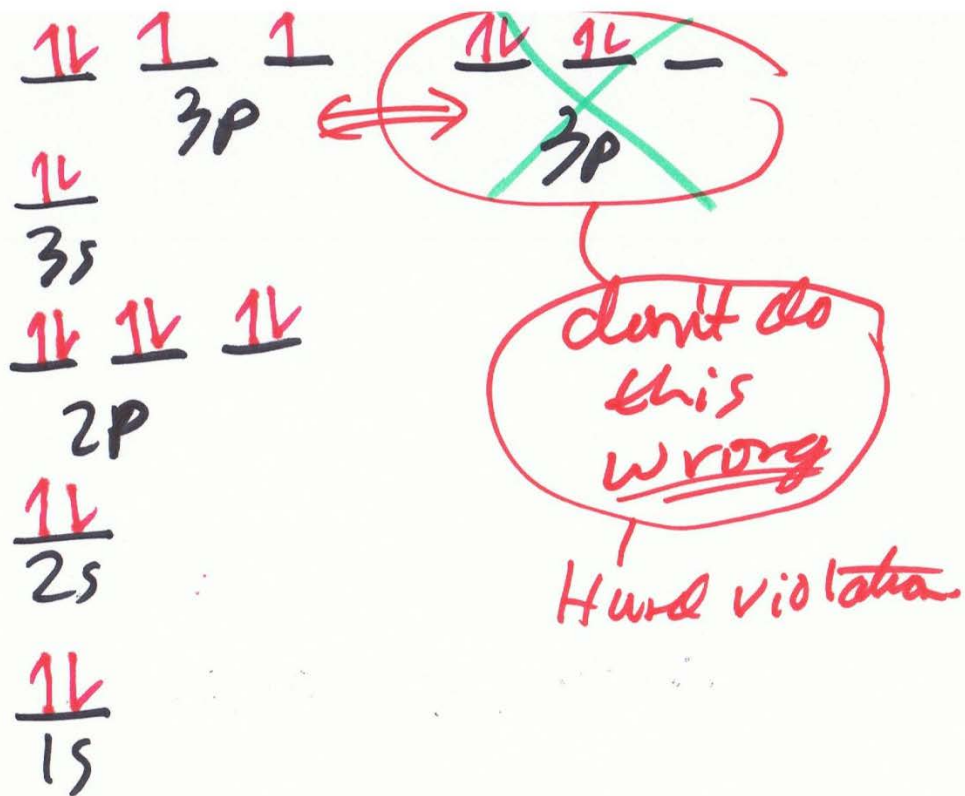
*d*

2 2 3

3B 4B 5B 6B 7B 8B 10B

1 H 1.00794	2 He 4.002602																
3 Li 6.941	4 Be 9.012182											5 B 10.811	6 C 12.0107	7 N 14.00674	8 O 15.9994	9 F 18.9984032	10 Ne 20.1797
11 Na 22.989770	12 Mg 24.3050	13 Al 26.981538	14 Si 28.0855	15 P 30.973761	16 S 32.066	17 Cl 35.4527	18 Ar 39.948										
19 K 39.0983	20 Ca 40.078	21 Sc 44.955910	22 Ti 47.867	23 V 50.9415	24 Cr 51.9961	25 Mn 54.938049	26 Fe 55.845	27 Co 58.933200	28 Ni 58.6934	29 Cu 63.546	30 Zn 65.39	31 Ga 69.723	32 Ge 72.61	33 As 74.92160	34 Se 78.96	35 Br 79.904	36 Kr 83.80
37 Rb 85.4678	38 Sr 87.62	39 Y 88.90585	40 Zr 91.224	41 Nb 92.90638	42 Mo 95.94	43 Tc (98)	44 Ru 101.07	45 Rh 102.90550	46 Pd 106.42	47 Ag 107.8682	48 Cd 112.411	49 In 114.818	50 Sn 118.710	51 Sb 121.760	52 Te 127.60	53 I 126.90447	54 Xe 131.29
55 Cs 132.90545	56 Ba 137.327	57 La 138.9055	72 Hf 178.49	73 Ta 180.9479	74 W 183.84	75 Re 186.207	76 Os 190.23	77 Ir 192.217	78 Pt 195.078	79 Au 196.96655	80 Hg 200.59	81 Tl 204.3833	82 Pb 207.2	83 Bi 208.98038	84 Po (209)	85 At (210)	86 Rn (222)
87 Fr (223)	88 Ra (226)	89 Ac (227)	104 Rf (261)	105 Db (262)	106 Sg (263)	107 Bh (262)	108 Hs (265)	109 Mt (266)	110 (269)	111 (272)	112 (277)	114 (289)	116 (289)	118 (293)			

58 Ce 140.116	59 Pr 140.90765	60 Nd 144.24	61 Pm (145)	62 Sm 150.36	63 Eu 151.964	64 Gd 157.25	65 Tb 158.92534	66 Dy 162.50	67 Ho 164.93032	68 Er 167.26	69 Tm 168.93421	70 Yb 173.04	71 Lu 174.967
90 Th 232.0381	91 Pa 231.03588	92 U 238.0289	93 Np (237)	94 Pu (244)	95 Am (243)	96 Cm (247)	97 Bk (247)	98 Cf (251)	99 Es (252)	100 Fm (257)	101 Md (258)	102 No (259)	103 Lr (262)



$\bar{e}$  Configuration. orbital diagram for  $\underline{\underline{S}}$



valence  $\bar{e}$  - outermost electrons  
these  $\bar{e}$  are involved in  
chemical reactions + bonding

main group element - valence  $\bar{e}$

$\bar{e}$  in the outermost shell,  
principal quantum # (n) period

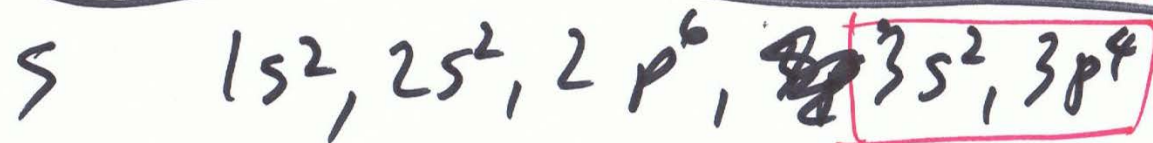
(# of valence  $\bar{e}$  = group #)

transition metal element - valence

e in the outer most period (n)

s + (n-1)d

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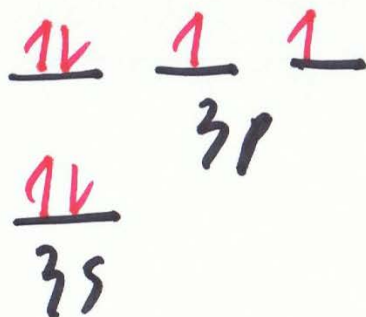
Valence e  
config S =  $3s^2, 3p^4$  → 6 valence e

group # VIA → 6 valence





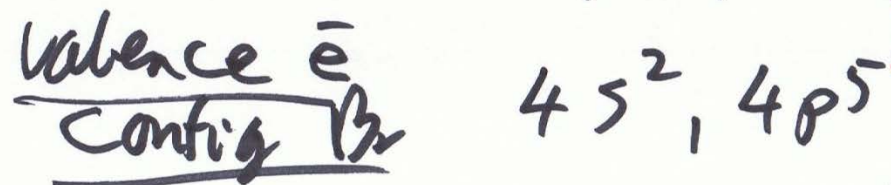
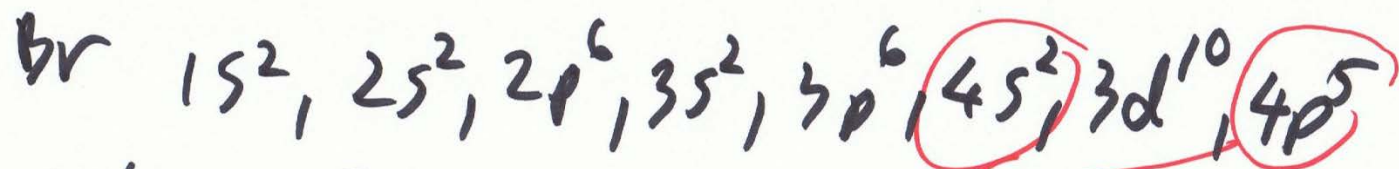
valence e config diagram for S



~~valence e config~~

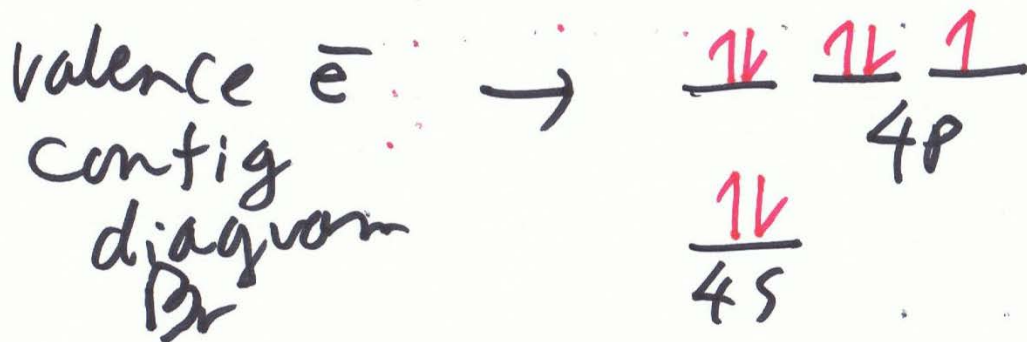
valence e config for V  $4s^2, 3d^3$





(outer most n-period = 4)

Br is group = VIIA  $\rightarrow$  7 valence e<sup>-</sup>



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87 Fr (223)	88 Ra (226)	89 Ac (227)	104 Rf (261)	105 Db (262)	106 Sg (263)	107 Bh (262)	108 Hs (265)	109 Mt (266)	110 (269)	111 (272)	112 (277)	114 (289) (287)	116 (289)	118 (293)									

*Handwritten notes:* "main gp." with a red circle around groups IA, IIA, and VIIA-VIIIA. "8B" with a bracket over groups 8, 9, and 10. "10B" with a bracket over groups 11 and 12.

58 Ce 140.116	59 Pr 140.90765	60 Nd 144.24	61 Pm (145)	62 Sm 150.36	63 Eu 151.964	64 Gd 157.25	65 Tb 158.92534	66 Dy 162.50	67 Ho 164.93032	68 Er 167.26	69 Tm 168.93421	70 Yb 173.04	71 Lu 174.967
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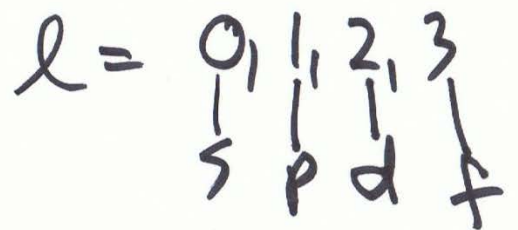


- principal quantum # = 4 @ review
- how many angular momentum quantum #

3/31 class

$$l = 0, \dots, n-1$$

$$n-1 = 4-1$$




p → l = 1 →  $m_l = -l, \dots, 0, \dots, +l$

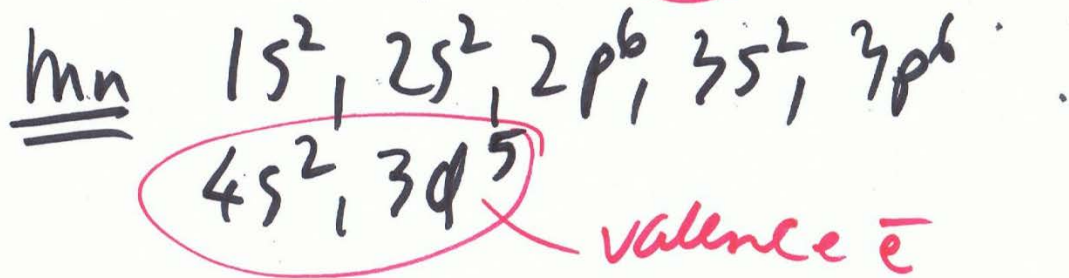
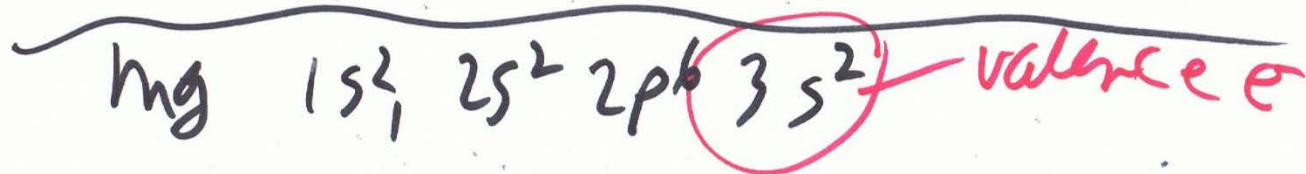
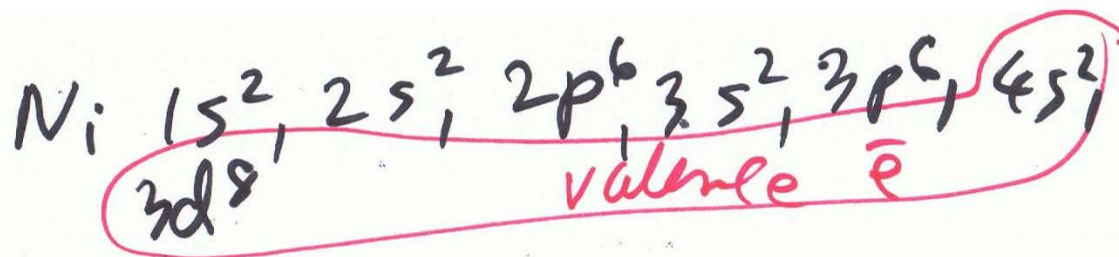
→  $m_l = -1, 0, +1$

for  $l = 2$  what are the possible  
magnetic quantum #?

$$m_l = -2, -1, 0, +1, +2$$

$l = d$  subshell — 5 orbitals









Announcements:		
	3/31/15	
①	① Q II - Chapter 7 + (maybe end of gases already on EC of Q II) + EC on 4/2 material	
	E II - Max = 100, min = 36.5 ave = 82.4	
②	E III 4/9	
③	deadline for "mastering" is last day classes	
④	<u>my lab sections</u> - normal syllabus - cannot make up in different lab prof section w/o documentation (if have documentation - I will plug in)	
	Must sign <del>out</del> + initial in for 30% of grade (results in higher grade than entire grade by answering questions)	
	4/2	
	① Q II today	
	② E III 4/9 R	