

CHAPTER 8 PERIODIC TABLE / TRENDS

Mendeleev $L \rightarrow R$ increasing mass

now $L \rightarrow R$ increasing atomic number (Z)

- now
- 1) Representative \rightarrow s, p block (A) ← AMERICAN
 - 2) Transition metal \rightarrow d (B) ← IUPAC
 - 3) Inner-transition element \rightarrow f IIB
Zn
Cd
Hg

American System

A \Rightarrow # = # valence e⁻'s \rightarrow all the e⁻'s in the outermost occupied E level

B $\Rightarrow ns^2(n-1)d^x$
 \uparrow 2 valence e⁻'s

P: $1s^2 2s^2 2p^6 3s^2 3p^3$ 5 } SA
As: [Ar] $(4s^2) 3d^{10} (4p^3)$ 5 }

Cr: [Ar] $4s^1 3d^5$ e⁻/e⁻ repulsion minimized
 $\Downarrow E$

METAL / SEMI-METALLIC / NON METALS
Metalloids

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	2) Transition metal \rightarrow d	(B) ↙	IUPAC
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American System

A \Rightarrow # = # Valence e^- 's \rightarrow all the e^- 's in the outermost occupied E level

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P: $1s^2 2s^2 2p^6 3s^2 3p^3$ 5 } 5A
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$\Downarrow E$

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how to write an element's symbol in a reaction

Metal \rightarrow symbol \rightarrow ^{NO} MOLECULES

semi-metallic \rightarrow " \rightarrow "

NONMETALS \Rightarrow molecules

DIATOMIC: $H_2, N_2, O_2, F_2, Cl_2, Br_2, I_2$

P \Rightarrow P₄ S \Rightarrow S₈

"OCTET RULE" \rightarrow the tendency for representative elements to gain, lose, or share e⁻'s to achieve $ns^2 np^6$ valence configuration

"isoelectronic" \Rightarrow same # of e⁻'s

Ne $1s^2 2s^2 2p^6$

F $1s^2 2s^2 2p^5$ F⁻ $1s^2 2s^2 2p^6$ Lewis $:\ddot{F}: \quad [:\ddot{F}:]^-$

Na $1s^2 2s^2 2p^6 (3s^1)$ Na⁺ $1s^2 2s^2 2p^6$ Na⁺ $[Na]^+$

Mg ~~$1s^2 2s^2 2p^6 3s^2$~~ $1s^2 2s^2 2p^6 (3s^2)$ Mg²⁺ $1s^2 2s^2 2p^6$

1A	2A	3A	4A	5A	6A	7A	8A
+1	+2	+3	+4	-3	-2	-1	0

transition metals $ns^2 (n-1)d^x$
* ions of t. metals are often NOT isoelectronic
with a noble gas

Ni $[Ar] 4s^2 3d^8$ Ni²⁺ $[Ar] 3d^8$