Different Forms of Metals

A metal is a substance that loses e^- to satisfy the octet rule

Two Types of Metals

Representative Metal

A metal that has a specific number of valance electrons, and always loses the same number of electrons to form a positive ion (*cation*)

Sodium (Na): 1 val e^- , +1 cation
Aluminum (Al): 3val e^-, +3 cation

Transition Metal

A metal that has a can have a varying (*changing*) amount of bonding electrons (val e^- + d e^-) to form multiple positive ions (*cations*)

Lead (Pb): 2 val e^- , +2 cation (Pb^{2+})
Lead (Pb): 4 val e^-, +4 cation (Pb^{4+})

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The Outliers – Group 4A and 8A

Group 4A and 8A groups have some strange rules

Group 4A [C, Si, Ge, Sn, Pb]

The "Carbon" Group

Group 4A had **different types of elements** allowing for either a +4 (*cation*) or -4 (*anion*) charge to form

C can rarely form a -4 charge with H
Si and Ge rarely form ion charges
Sn and Pb are transition metals that form +4 ions along with +2 and +6)

Group 8A [He, Ne, Ar, Kr, Xe, Rn]

The "Noble Gases" Group

With **8 valance electrons** in group 8A these elements do not form ions, preferring to be along not bonded

Noble gases can rarely form bonds with halogens (7A) elements, such as XeF_6 (*Xenon Hexafluoride*), based on *sharing of electrons*.

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Ion Charge Data Table

Group	Element Type	Valence e^-	Ion Type	Lose or Gain #e^-	Ion Charge (+ or -)
1A (1)	Metal	1	Cation (+)	Lose 1e^-	+1
2A (2)	Metal	2	Cation (+)	Lose 2e^-	+2
3A (13)	Metal	3	Cation (+)	Lose 3e^-	+3
5A (15)	Non-Metal	5	Anion (-)	Gain 3e^-	-3
6A (16)	Non-Metal	6	Anion (-)	Gain 2e^-	-2
7A (17)	Non-Metal	7	Anion (-)	Gain 1e^-	-1

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