Welcome to Jeff's CHEM 4 lecture!

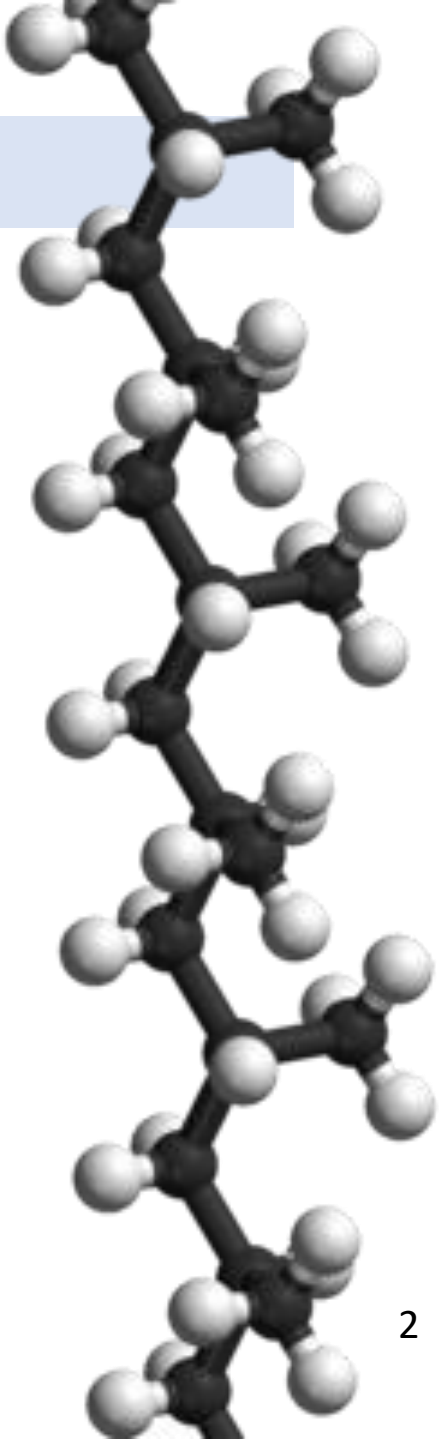
We'll be starting in just a bit…

While you are waiting:

1) Go to LearningCatalytics.com to prepare for today's clicker questions. Login with your MasteringChemistry login. **Session ID = 82407234**
2) Make sure your Zoom User ID is your "first name last name". You can open "participants", then find your name and click on it to change it.
3) When I need to cheer up, I like to listen to the music I heard my parents play in the house when I was growing up. Yesterday, I was listening to Yusuf/Cat Stevens' *Peace Train*. It has a great message and I thought it would be nice to share it with all of you. *Let us know in the chat… what is your favorite music (artist or song) to cheer you up or empower you?*

Are up keeping up with CHEM 4?

- ✓ **CHEM 4 Website: tinyurl.com/SacStateChem4**
  - ✓ Check **Aug/Sept calendar** for PowerPoint slides, readings, and homework.
- ✓ **Help:**
  - ✓ Jeff's office hours: MWF 9 – 9:30 am and 11 – 11:30 am; and by appointment
  - ✓ PAL office hours: link is on our CHEM 4 website
  - ✓ Can email me questions: Show question and email picture of work
- ✓ **Homework:**
  - ✓ Ideally, do it after every lecture so you are prepared for next class.
  - ✓ If you occasionally do your homework late, you will get credit for it.
- ✓ **Clickers:**
  - ✓ Automatic 2 pts for each time you vote (right or wrong).
  - ✓ ***Don't vote in a class you aren't registered in!!!!!***
  - ✓ If you are here, but unable to vote, message me in Zoom chat.
- ✓ **Optional:**
  - ✓ *Peer Assisted Learning (PAL)* – MW 12 noon is full.
  - ✓ *Commit to Study (C2S)* – Allows you to drop lowest exam.



Review clicker question (Covers material from last lecture)

Go to LearningCatalytics.com and login with your MasteringChemistry (Session ID = 82407234).

1) Which of the boxed terms (A-J) is correctly used in the following paragraph?

"When reacting with sulfur, the compound (A) strontium will gain (B) electrons to form the Sr^{1+} (C) anion (D). Sulfur, a typical metal (E), will gladly accept electrons from strontium resulting in the formation of the S^{2-} (F) cation (G). At this point the two ions repel (H) each other to form the molecular (I) compound Sr_2S (J)."

Review clicker question (Covers material from last lecture)

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2) How many protons, neutrons and electrons does $^{120}Sn^{4+}$ have?

A) 70 p^+, 50 n^o and 50 e^-

B) 70 p^+, 50 n^o and 74 e^-

C) 50 p^+, 70 n^o and 54 e^-

D) 50 p^+, 70 n^o and 46 e^-

Answer:

- **Protons** = the atomic number of Sn on the periodic table = 50 p^+
- **Neutrons** = mass # - atomic # = 120 – 50 = 70 n^o
- **Electrons** = # p^+ - charge = 50 – 4 = 46 e^- (check answer: 50 p^+ + 46 e^- = 4+ charge)

Review clicker question (Covers material from last lecture)

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3) Which of the following formulas is an unlikely compound for aluminum to form based on expected ion charges?

A) $AlCl_3$ B) Al_3Se_2 C) AlN

Answer: The following charges are based on the position of the elements on the periodic table.

Al^{3+} Cl^-	Al^{3+} Se^{2-}	Al^{3+} N^{3-}
1:3 ratio	2:3 ratio	1:1 ratio
Formula = $AlCl_3$	Formula = Al_2Cl_3	Formula = AlN

CHEM 4 lecture

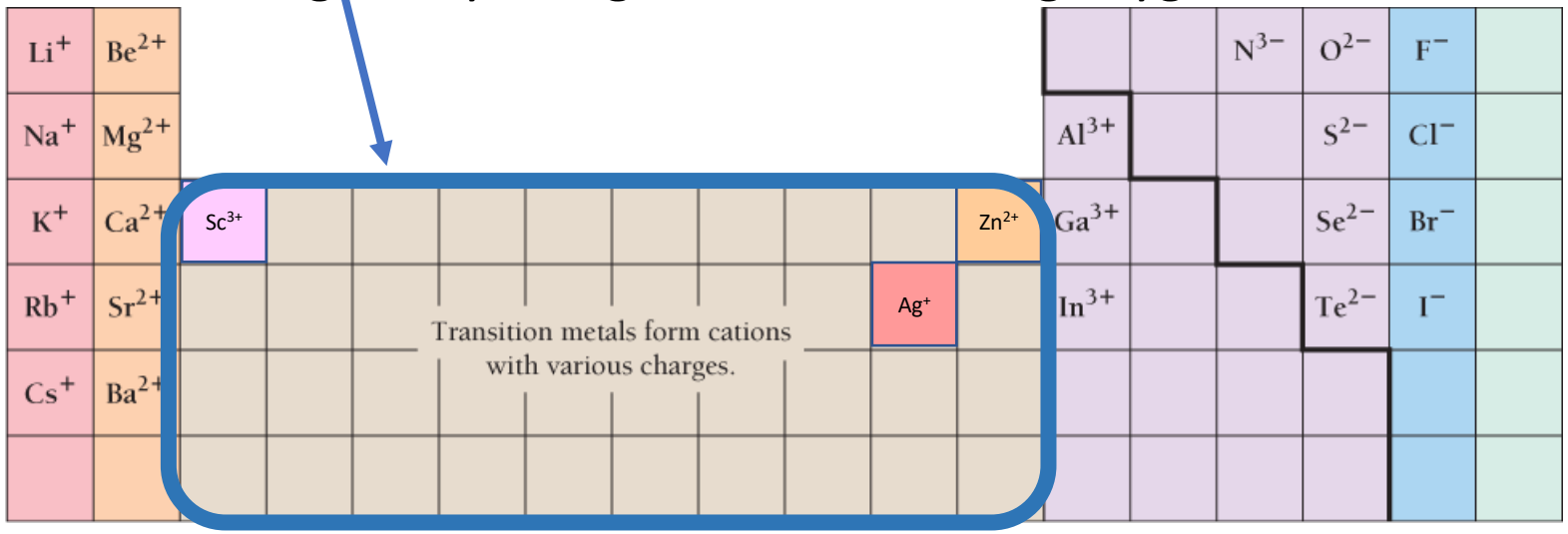
Friday – September 18, 2020

Sec 5.6 - 5.7

Naming Ionic Compounds

Reading clicker question (covers material from today's assigned reading)
Go to LearningCatalytics.com and login with your MasteringChemistry (Session ID = 82407234).

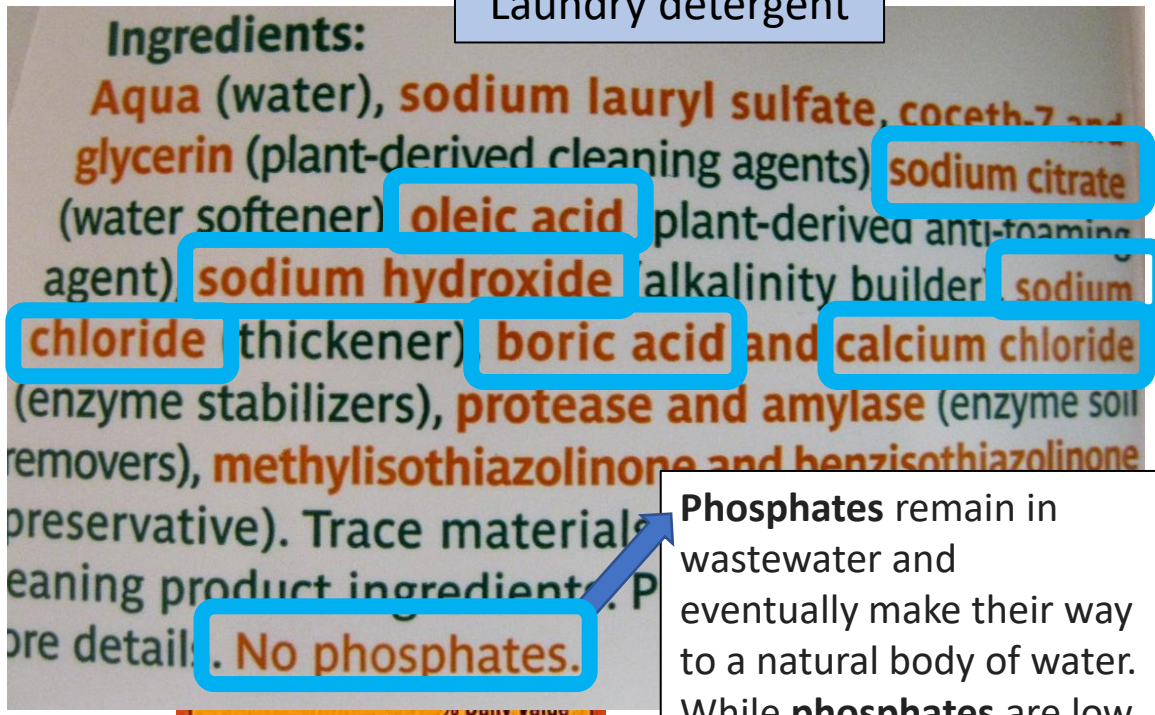
4) Which of the following statements is false? [**Note:** Type I metals always have the same charge; Type II metals can have more than one possible charge.]
   A) Polyatomic ions are groups of atoms with an overall net charge.
   B) Most alkaline earth metals are Type I metals.
   C) When naming ionic compounds, the name of the cation always comes first.
   D) When naming a Type II ionic compound, roman numerals are used to identify the charge on the metal.
   E) Most transition metals are Type I metals.
   F) Oxyanions are negatively charged ions containing oxygen.



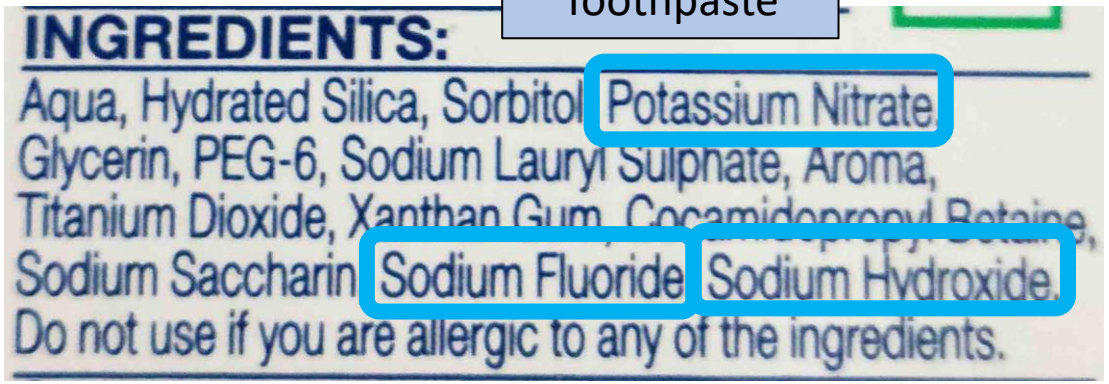
Application: Household products and foods

Application: Household products and foods

Laundry detergent

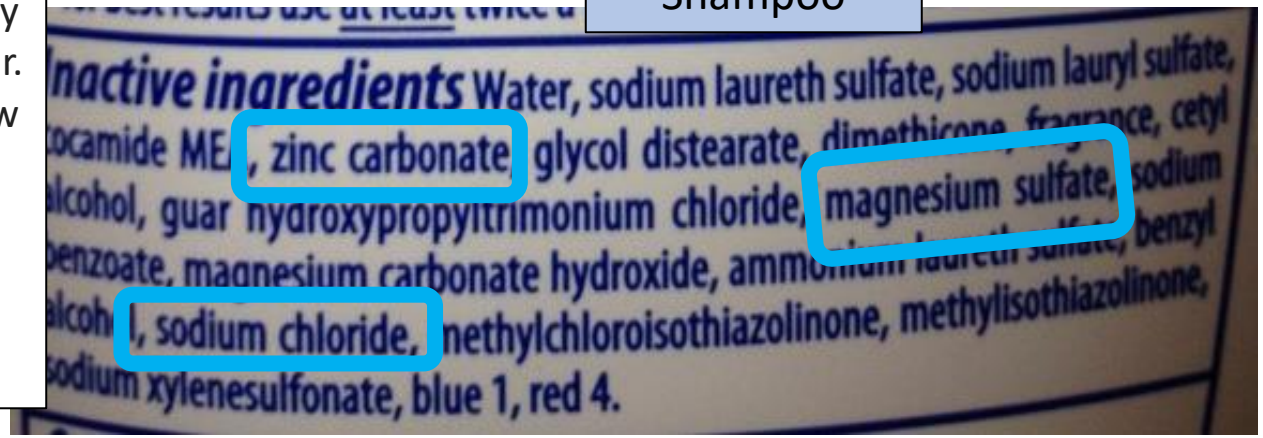


Toothpaste



Phosphates remain in wastewater and eventually make their way to a natural body of water. While **phosphates** are low toxicity, they instead cause nutrient pollution and feed the algae. This leads to eutrophication and harmful algal bloom.

Shampoo

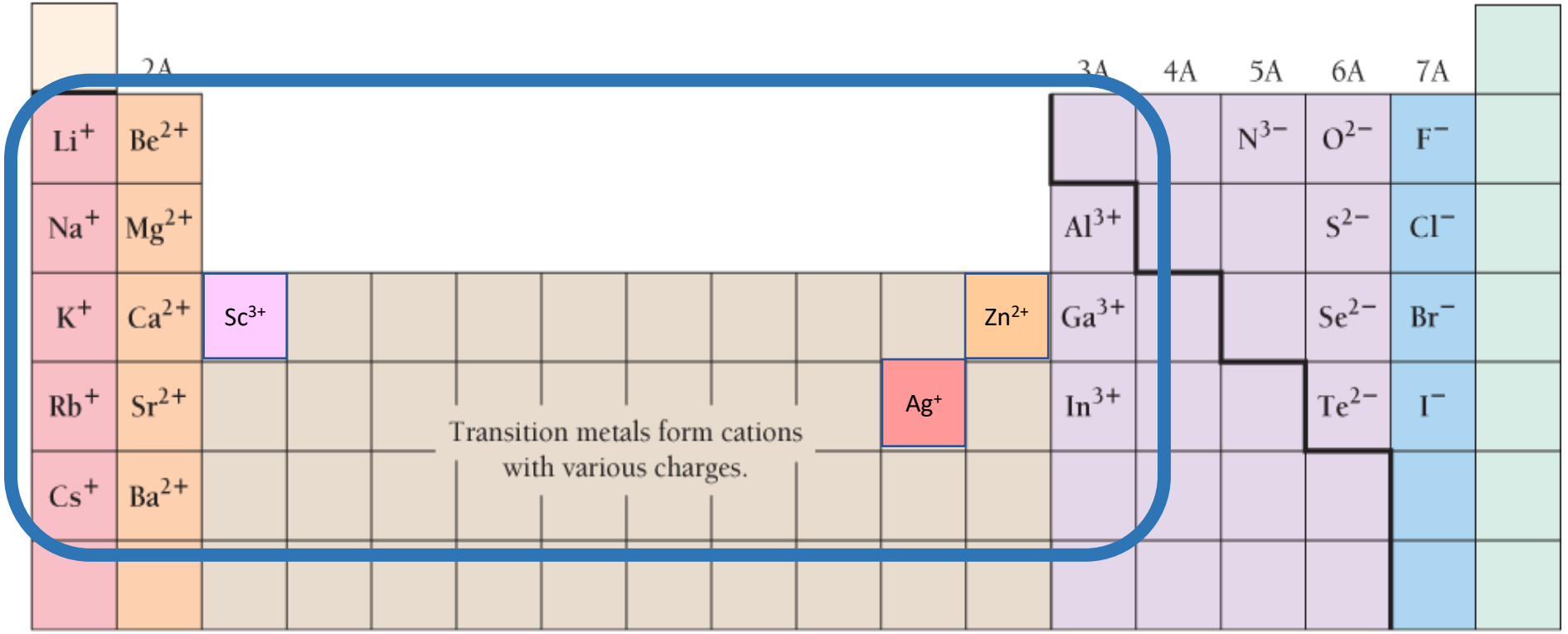


Baking soda

Background: Naming ionic compounds

Naming Type `I`, Binary ionic compounds

- Binary = only 2 elements
- Ionic = metal and non-metal
- Type `I` = metal always has the same charge (labeled on periodic table below)



Background: Naming Type `I`, Binary ionic compounds

Name → Formula

- Write down each ion.
- Combine ions in a ratio that cancels their charges.

- **Examples:**

Name	Ions	Ratio	Formula
calcium chloride	Ca^{2+} Cl^-	1:2	$CaCl_2$
aluminum oxide	Al^{3+} O^{2-}	2:3	Al_2O_3
silver fluoride	Ag^+ F^-	1:1	AgF

Background: Naming Type `I`, Binary ionic compounds

Formula → Name

- Name each ion.
- Change the ending of the non-metal to "-ide".

- **Examples:**

Formula	Name
FrBr	francium bromide
MgS	magnesium sulfide
$BeCl_2$	beryllium chloride

Progress clicker question (covers material we are learning now)

Go to LearningCatalytics.com and login with your MasteringChemistry (Session ID = 82407234).

5) What is the formula for zinc nitride?

A) ZnN

B) ZnN_2

C) Zn_2N

D) Zn_2N_3

E) Zn_3N_2

F) ZnN_3

Answer: The following charges are based on the position of the elements on the periodic table.

zinc ion	nitride ion
Zn^{2+}	N^{3-}

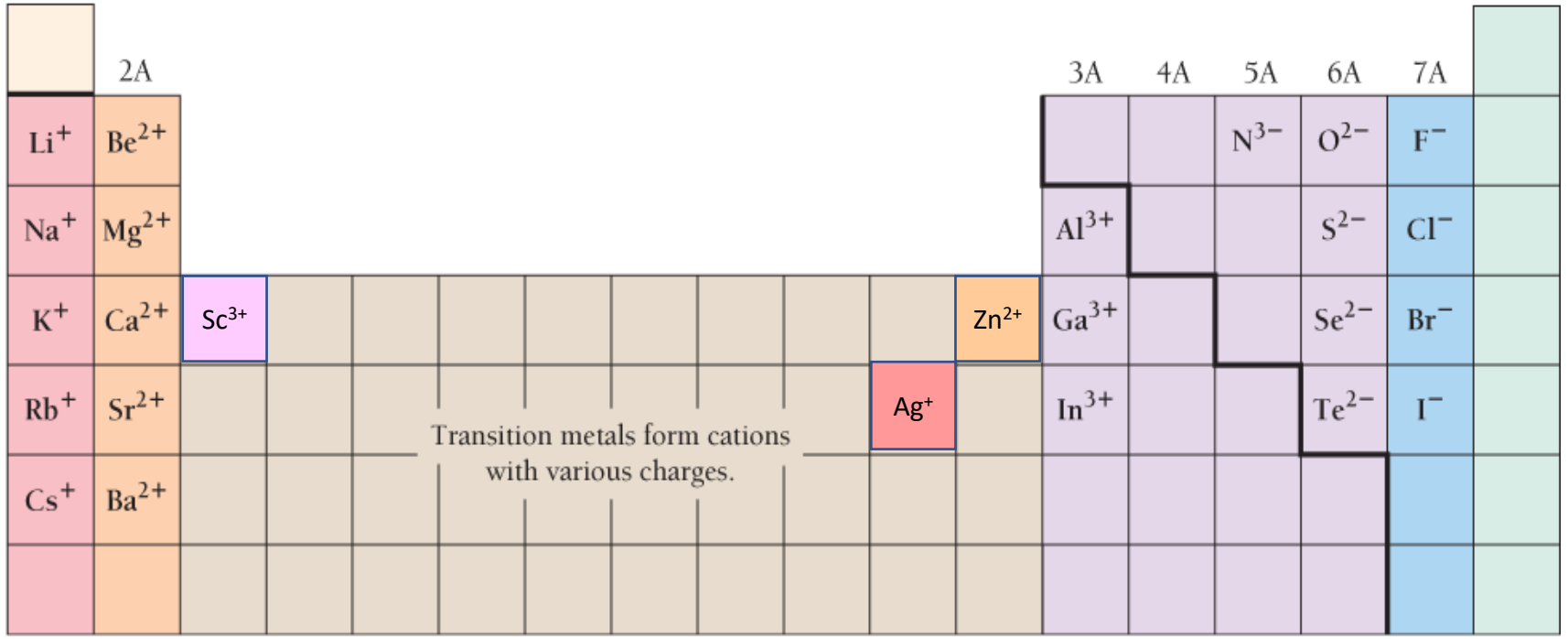
cancel in a 3:2 ratio

Formula = Zn_3N_2

Background: Naming ionic compounds

Naming Type `II`, Binary ionic compounds

- Binary ionic = only 2 elements (metal and non-metal).
- Type **`II`** = metal can have varying charge (all the metals that are NOT labeled on periodic table below).
- Uses roman numerals to indicate the charge on the metal.



Background: Naming Type **II**, Binary ionic compounds

Name → Formula

- Write down each ion. The roman numeral indicates the charge on the metal.
- Combine ions in a ratio that cancels their charges.

- **Examples:**

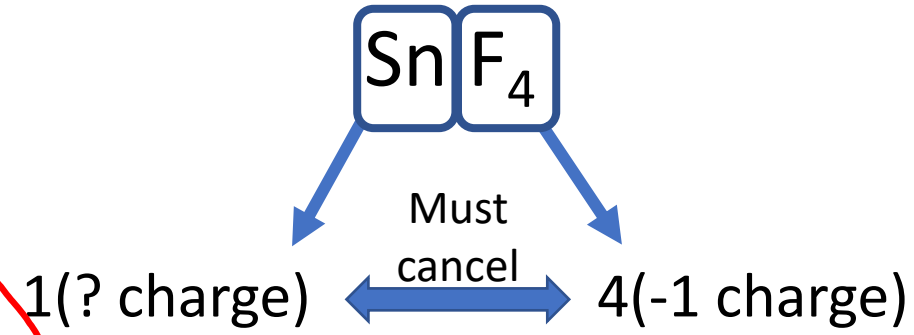
Name	Ions	Ratio	Formula
copper (**I**) oxide	Cu^{+} O^{2-}	2:1	Cu_2O
tin (**II**) fluoride	Sn^{2+} F^{-}	1:2	SnF_2
lead (**II**) oxide	Pb^{2+} O^{2-}	1:1	PbO
lead (**IV**) oxide	Pb^{4+} O^{2-}	1:2	PbO_2

Background: Naming Type `II`, Binary ionic compounds

Formula → Name

- Name each ion.
- Change the ending of the non-metal to "-ide".
- Use the expected charge on the non-metal to determine the charge (and roman numeral) for the metal.
- **Examples:**

Formula	Name
SnF_4	tin(IV) fluoride
$CrBr_2$	chromium (`II`) bromide
$CrBr_3$	chromium (`III`) bromide
Co_3N_2	cobalt (`II`) nitride



The 1 Sn must be +4 to cancel the 4 F^-.
The +4 determines the roman numeral.