Modeling Silicates

1. Use the dots below to draw a single tetrahedron of silicate

What is the charge of the tetrahedron? $\text{SiO}_4$: $\text{Si}=+4$, each $\text{O}=-2$ Total = -4

If Iron has a charge of +2, how many Fe$^{+2}$ cations are needed to balance the charge? 2

Write out the formula, including Iron: $\text{Fe}_2\text{SiO}_4$

What is the name of this mineral? Olivine

2. Use the dots below to draw a single chain silicate

What is the charge of each tetrahedron? $\text{SiO}_3$: $\text{Si}=+4$, each $\text{O}=-2$ Total -2

If Iron has a charge of +2, how many Fe$^{+2}$ cations are needed to balance the charge? 1

Write out the formula, including Iron: $\text{FeSiO}_3$

What is the name of this mineral? Augite
3. Use the dots below to draw a double chain silicate:

What is the charge of each tetrahedron? $\text{SiO}_{2.5} \text{ inside, SiO}_3 \text{ outside: Si}_4\text{O}_{11} \text{ Total -6}$
If Iron has a charge of +2, how many Fe$^{+2}$ cations are needed to balance the charge? 3
Write out the formula, including Iron: $\text{Fe}_3\text{Si}_4\text{O}_{11}$
What is the name of this mineral? Amphibole

4. Use the dots below to draw a sheet silicate:

What is the charge of each tetrahedron? $\text{Si}_2\text{O}_5 \text{ Total -2}$
If Iron has a charge of +2, how many Fe$^{+2}$ cations are needed to balance the charge? 1
Write out the formula, including Iron: $\text{FeSi}_2\text{O}_5$
What is the name of this mineral? Biotite
Challenge: Use the dots to draw a framework silicate (Hint: You can still build upward)

What is the charge of each tetrahedron? \( \text{SiO}_2 \) Total 0

If Iron has a charge of +2, how many \( \text{Fe}^{+2} \) cations are needed to balance the charge? 0

Write out the formula, including Iron: \( \text{SiO}_2 \)

What is the name of this mineral? Quartz