

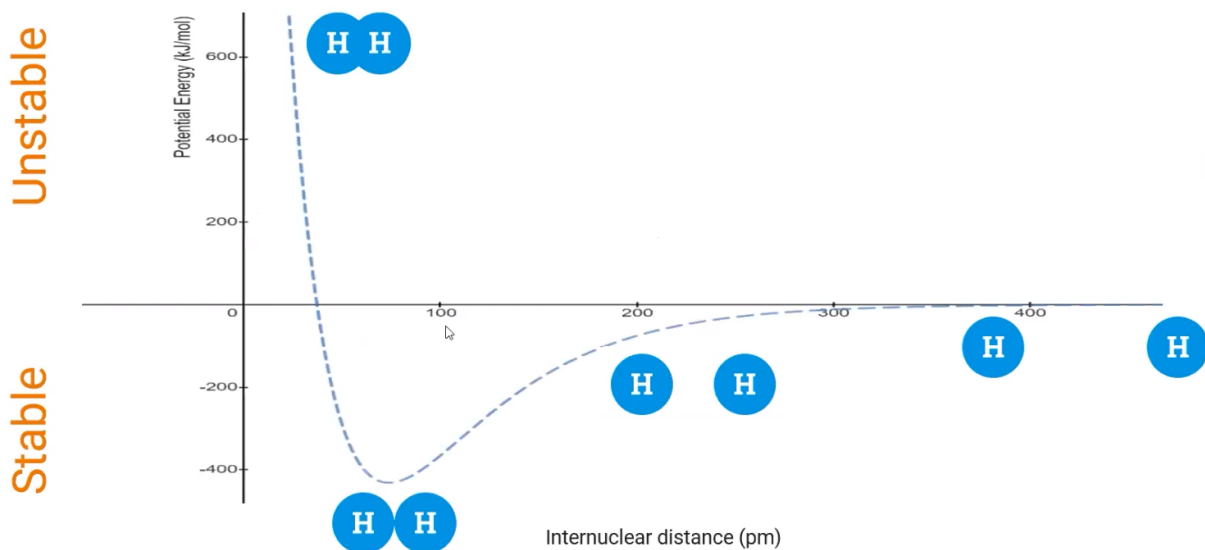
AP Chemistry Daily Videos

2.2 Intramolecular Force and Potential Energy

Video #1



1. The image above is of two atoms (green being the nucleus). Mark what charge the nucleus has and what charge the blue electron has. Describe attractive forces and repulsive forces between two atoms and their electrons.
2. The _____ the potential energy the stronger the chemical bond. Anything above 0 kJ/mol is considered unstable.
3. When atoms form a chemical bond, is energy released (neg) or absorbed (pos)?
4. Write notes to understand the effects of internuclear distance, PE, and stability of a chemical bond. What balance must be met in order to form a stable arrangement?



5. How do your notes above relate to Coulomb's Law?

6. Complete the following table:

| Bond Order | Single Bond | Double Bond | Triple Bond |
|-------------------------|-------------|-------------|-------------|
| Bond diagram | | | |
| Lewis Structure Diagram | | | |
| Strength | | | |
| Length | | | |

7. According to Coulomb's Law, provide an example and explanation of two ions in an ionic chemical bond that forms large electrostatic potential.

Video #2

1. Pause the video at 0:53 and attempt the problem, then evaluate how you did and identify any errors.

The energy required to separate the ions in the Mg(OH)_2 crystal lattice into individual $\text{Mg}^{2+}(\text{g})$ and $\text{OH}^{-}(\text{g})$ ions, as represented in the table below, is known as the lattice energy of $\text{Mg(OH)}_2(\text{s})$. As shown in the table, the lattice energy of $\text{Sr(OH)}_2(\text{s})$ is less than the lattice energy of $\text{Mg(OH)}_2(\text{s})$. Explain why in terms of periodic properties and Coulomb's law.

| Reaction | Lattice Energy (kJ/mol) |
|--|-------------------------|
| $\text{Mg(OH)}_2(\text{s}) \rightarrow \text{Mg}^{2+}(\text{g}) + 2 \text{OH}^{-}(\text{g})$ | 2900 |
| $\text{Sr(OH)}_2(\text{s}) \rightarrow \text{Sr}^{2+}(\text{g}) + 2 \text{OH}^{-}(\text{g})$ | 2300 |

2. Pause the video at 1:41 and attempt the problem, then evaluate how you did and identify any errors.

The potential energy diagram is given for $\text{C}=\text{O}$. A student claims that the curve for a $\text{C}-\text{O}$ would be less deep and to the right of the curve for $\text{C}=\text{O}$. Do you agree with this claim? Explain why or why not.

