Calcium Fluoride is a solid and when there are multiple molecules around they form a cube-like structure that is centralized around the calcium molecules. The crystal lattice structure that Calcium Fluoride is also known as the fluorite structure. Figure #1 shows what Calcium Fluoride looks like when it's in the crystal lattice structure. When Calcium Fluoride is in a single molecule it forms a Quasilinear structure. Quasilinear means the molecule resonates between a linear shape and a bent shape.

**Why CaF2 is Quasilinear**

Calcium Fluoride is a polyatomic molecule that contains one calcium molecule and two fluoride molecules. Calcium Fluoride is a Quasilinear molecule the bonds are created from the single electrons of calcium and the single electron from fluoride. CaF2 has its electrons contained within the 3d orbitals and are able to move between $d_{yz}$ and $d_{z^2}$ squared. The molecule is linear when they are in the $d_{z^2}$ orbitals the molecule is also the most stable in this shape. When the electrons are in the $d_{yz}$ orbitals the molecule becomes bent. The molecule resonates between these two shapes making it quasilinear. Figures two and three show how the d-orbitals cause the molecule to bend.
Fig # 2 Fig # 3

References


Outside Links

Problems

1. Q. How is CaF₂ made in the lab?
A. It is made by mixing Calcium Carbonate and hydrofluoric acid to give calcium fluoride, carbon dioxide, and water.

2. Q. Is CaF₂ a polar molecule?
A. In the Linear shape CaF₂ is non-polar, but in the bent shape it becomes polar.

3. Q. Is CaF₂ a covalent or ionic molecule?
A. The molecule is covalent because each of the atoms are sharing an electron to form the bonds.

4. Q. How Many total electron are there in the CaF₂ Molecule?
A. There are 16 electrons in CaF₂.

5. Q. Why is CaF₂ Molecule bent when the electrons are in the d_yz orbitals?