

Name Mr. Shank

Period AP 1, 2, 3

Polar Molecules

1. What is a dipole?

A dipole is a separation of positive and negative charge.

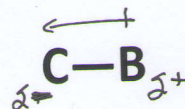
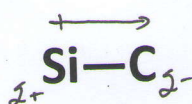
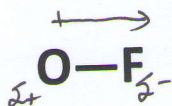
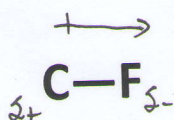
2. Why are many bonds dipoles? Your answer must include a discussion of electronegativity.

Many bonds are between atoms of different elements, and different elements have different electronegativities. The difference in electronegativity between two atoms in a bond causes the bond to be polar, with the more electronegative atom drawing more electrons toward it and taking a partial negative charge, and the less electronegative atom taking a partial positive charge. The separation of charges on the two atoms makes polar bonds dipoles.

3. Why are many molecules dipoles? Your answer must include a discussion of bond dipoles.

A molecular dipole is the vector sum of the bond dipoles in a given molecule. While it is possible that the magnitude and direction of the bond dipoles may add in such a way that the molecule possesses no net dipole, for many molecules this is not the case, and there is a net molecular dipole.

4. Draw an arrow over each of the bonds below, indicating which atom in the bond is partially positive and which atom in the bond is partially negative. (partial '+' ($\delta+$) \longleftarrow \longrightarrow partial '-' ($\delta-$):)



5. For each of the molecules below:

- Draw the correct Lewis structures
- Draw a 3D picture
- Draw small arrows indicating each bond dipole
- Draw a large arrow indicating the molecular dipole

<p>Ex. H₂CO</p> <p>Bond Dipole \longleftarrow</p> <p>Molecular Dipole \longrightarrow</p>	<p>(i) CH₃OH</p>	<p>(ii) CH₄</p> <p>no molecular dipole</p>
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