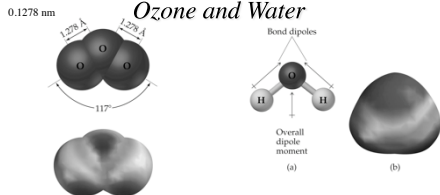


Molecular Size, Shape & Properties Ozone and Water

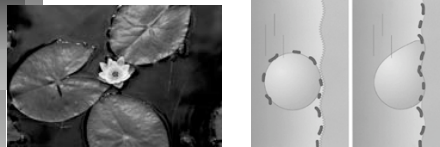


- Resultant Molecular Dipoles > 0
- Solubility: Polar molecules that dissolve or are dissolved in like molecules

- [The Lotus flower](#)
- [Water & dirt repellancy](#)

The "Lotus Effect" Biomimicry

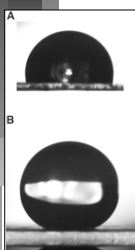
<http://www.bfi.org/Trimtab/spring01/biomimicry.htm>



- ▶ Lotus petals have micrometer-scale roughness, resulting in water contact angles up to 170°
- ▶ See the Left image in the illustration on the right.

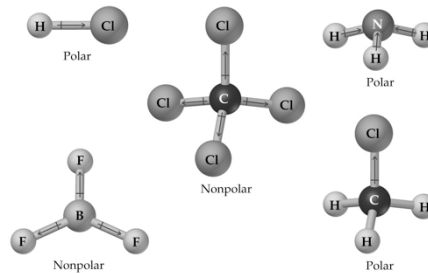
The "Lotus Effect" Biomimicry

<http://www.sciencemag.org/cgi/content/full/299/5611/1377/DC1>



- ▶ Isotactic polypropylene (i-PP) melted between two glass slides and subsequent crystallization provided a smooth surface. Atomic force microscopy tests indicated that the surface had root mean square (rms) roughness of 10 nm.
- ▶ A) The water drop on the resulting surface had a contact angle of $104^\circ \pm 2$
- ▶ B) the water drop on a superhydrophobic i-PP coating surface has a contact angle of 160° .

Science, 299, (2003), pp. 1377-1380, H. Yildirm Erbil, A. Levent Demirel, Yonca Avc, Olcay Mert

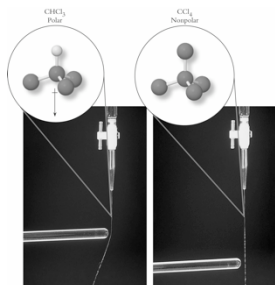


<http://chemconnections.org/COT/VSEPR1/>

BONUS: Questions #2, 3, & 4

DVC Student Project Group

<http://chemconnections.org/COT/VSEPR1/VSEPR/VSEPR-WKS-1-12.pdf>



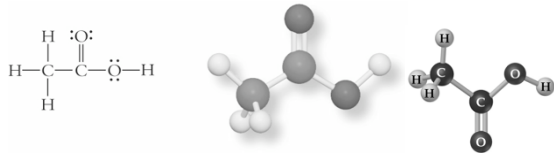
An electrically charged rod attracts a stream of chloroform but has no effect on a stream of carbon tetrachloride.

QUESTION

Which of the following molecules has a dipole moment?

- BCl_3
- SiCl_4
- PCl_3
- Cl_2
- none of these

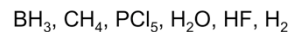
Acetic acid



- Is acetic acid polar or non-polar?
- Will acetic acid be miscible in water?

QUESTION

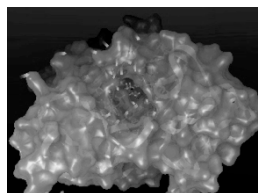
How many of the following molecules possess dipole moments?



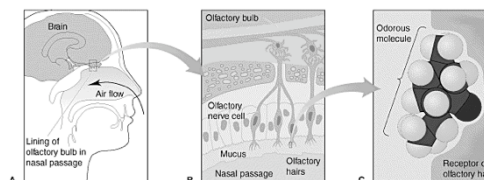
- A) 1
- B) 2
- C) 3
- D) 4
- E) 5

Proteins & Small Molecules

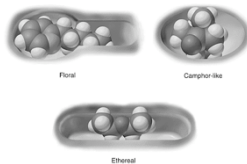
The interaction of a large protein bio-polymer, acetylcholinesterase, with a relatively small molecule of acetylcholine. A general process similar to the way that scientists think we smell.



Molecular Shape & Smell Theory



Historical view of a few smell receptors.



4 October 2004

The Nobel Assembly at Karolinska Institutet has today decided to award The Nobel Prize in Physiology or Medicine for 2004 jointly to

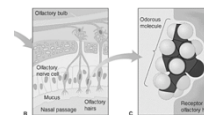
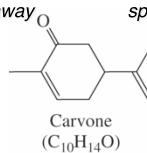
Richard Axel and **Linda B. Buck**

for their discoveries of

"odorant receptors and the organization of the olfactory system"

<http://dyochem.org/COT/chemical-communication/ChemComm.html>

S-(+)-*d*-carvone caraway *R*-(-)-*l*-carvone spearmint



They discovered a large gene family, comprised of some 1,000 different genes (three per cent of our genes) that give rise to an equivalent number of olfactory receptor types. These receptors are located on the olfactory receptor cells, which occupy a small area in the upper part of the nasal epithelium and detect the inhaled odorant molecules.

Odorant Receptors and the Organization of the Olfactory System

