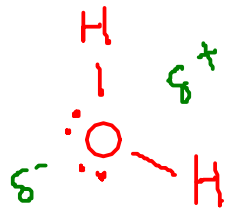
EXAMPLES

Water, H_2O

H: 2 x 1
O: 1 x 6
8

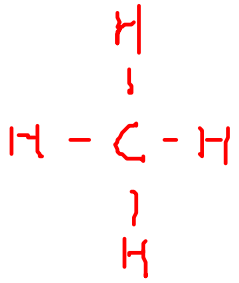


Polar bonds? O is more electronegative than H, so we think O-H bonds should be polar.

Molecule is BENT. we expect electrons to be pulled towards the oxygen "side" of the molecule, making it POLAR.

methane, CH_4

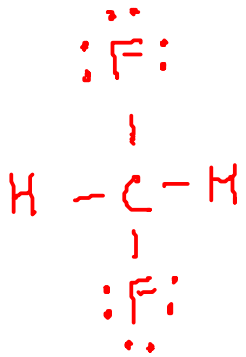
C: 1 x 4
H: 4 x 1
8



Methane is a tetrahedral molecule, and it is NONPOLAR, since all its bonds are nonpolar.

CH_2F_2

C: 1 x 4
H: 2 x 1
F: 2 x 7
20

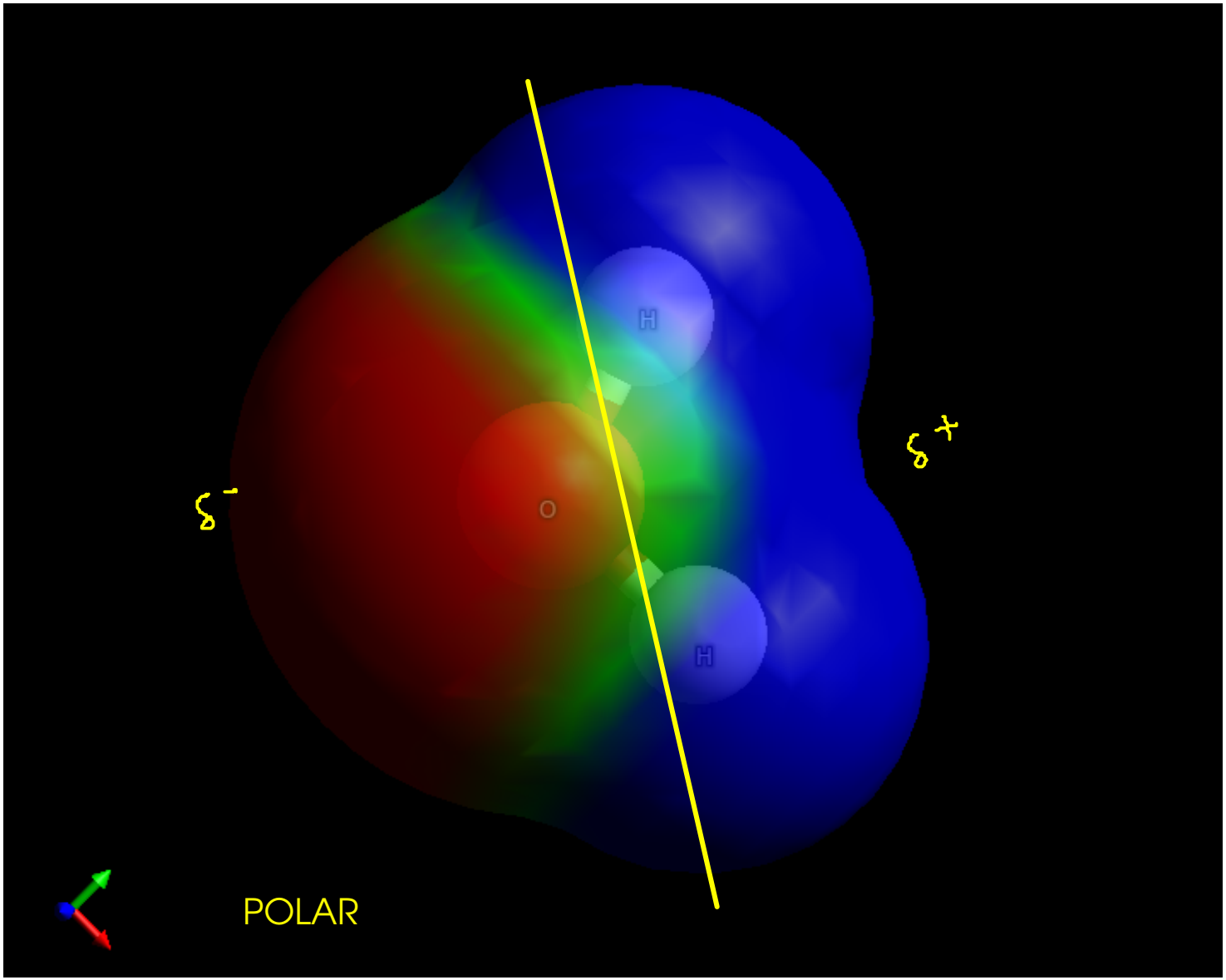


Like methane, this molecule is tetrahedral. UNLIKE methane, this molecule has some polar bonds (C-F).

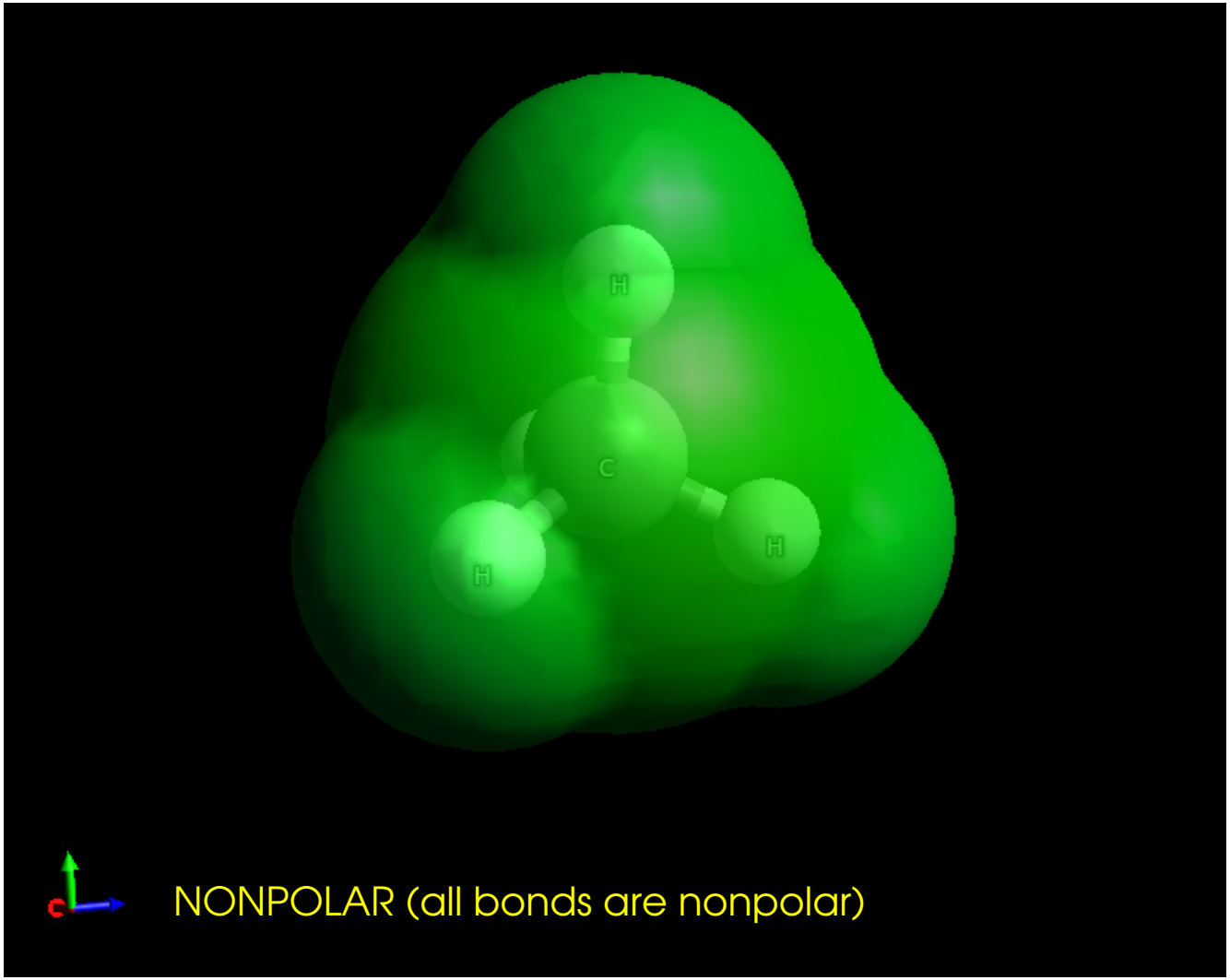
This molecule is POLAR, since fluorines will pull electrons to their "side" of the molecule. (The Lewis structure doesn't show it, but in 3D, the fluorines are on the same side!)

H_2O

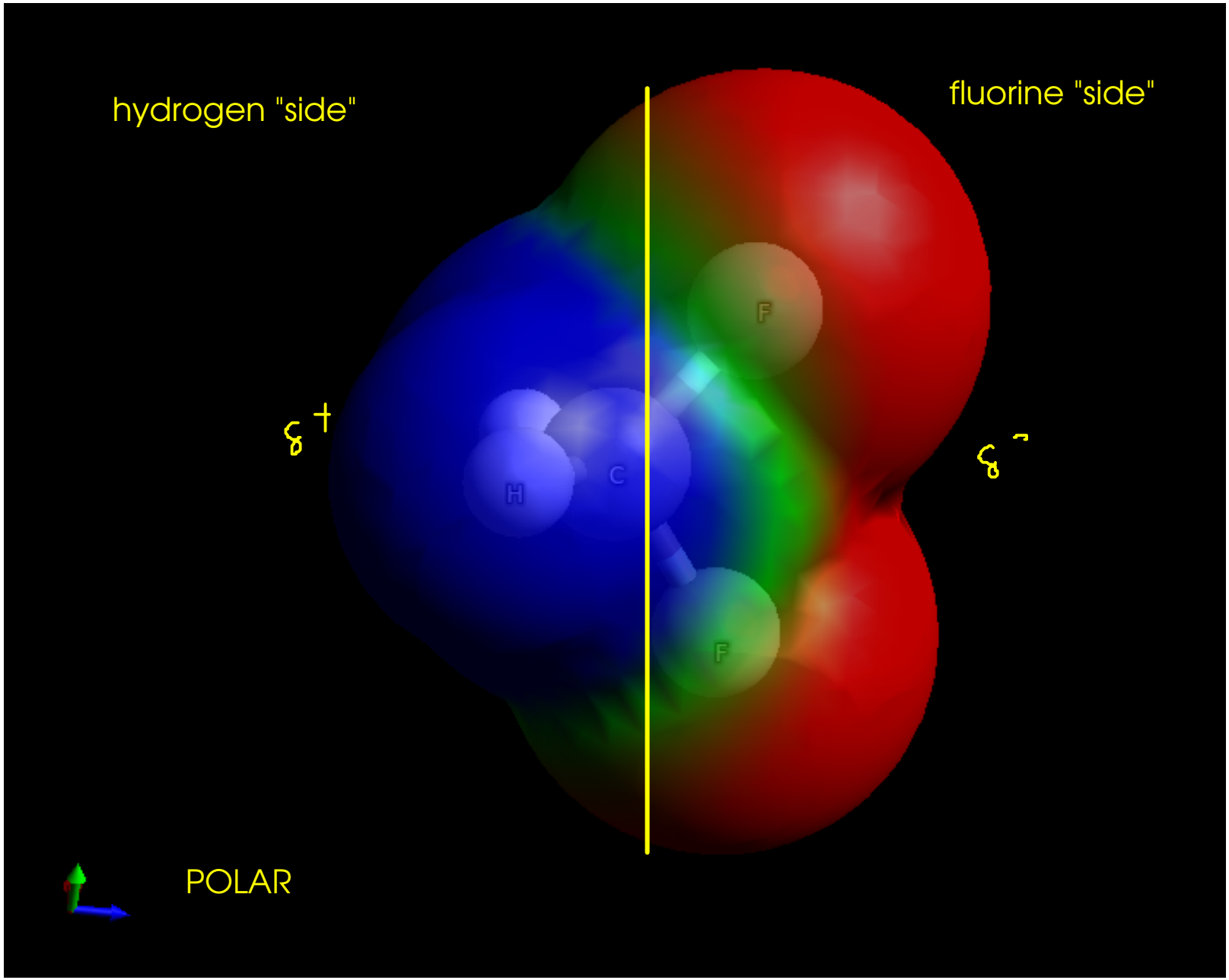
This ball-and-stick model shows electrostatic potential - red for more negative and blue for more positive



CH_4

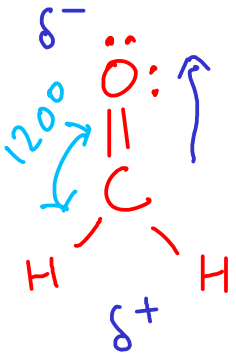


CH_2F_2



H_2CO

H : 1 x 2
C : 4
O : 6
12

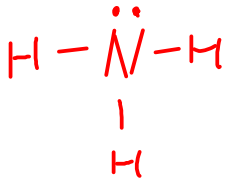


What about shape? TRIGONAL PLANAR. There are three things (=O, 2 -H) around the central carbon, so they will spread out as far as possible - 120 degrees.

Polarity? The C=O bond is a polar bond, and it is not "canceled" out by other bonds. The molecule is POLAR.

NH_3

N : 5
H : 1 x 3
8



Shape? There are FOUR groups around the central nitrogen atom - 109.5 degrees apart.(same as tetrahedral). The ATOMS in the molecule form a PYRAMID - we call the structure PYRAMIDAL.

Polarity? N-H bonds are polar, and they are arranged in such a way that electrons can be pulled towards the nitrogen "top" of the pyramid. So the nitrogen end of the pyramid will be slightly negative and the bottom hydrogens will be slightly positive. A POLAR MOLECULE!

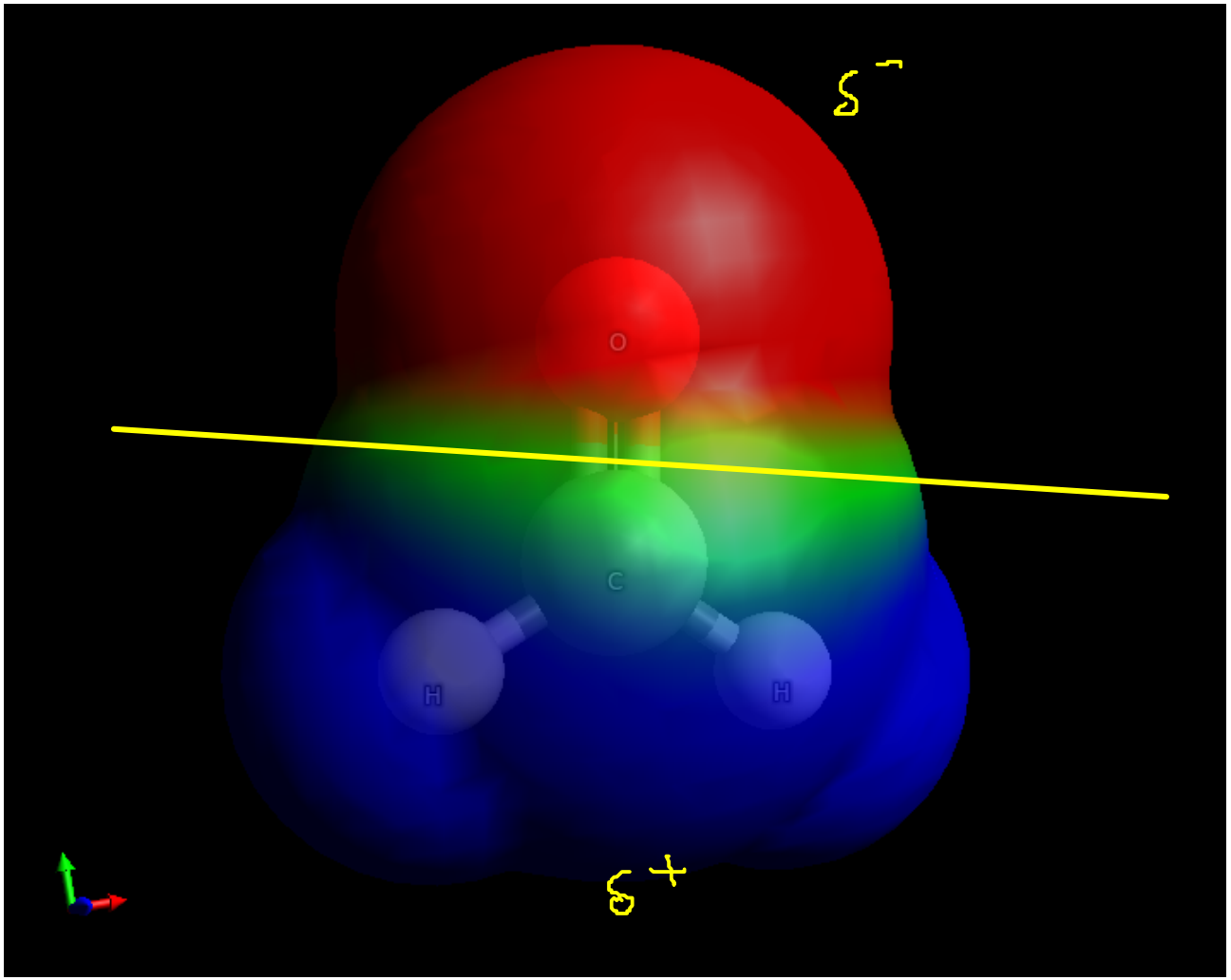
CO_2

C : 4
O : 6 x 2
16

Shape? LINEAR. The oxygen atoms can move 180 degrees apart.

Polarity? C=O bonds are polar. BUT, they are 180 degrees apart, so they cancel each other out. Carbon dioxide is NONPOLAR.

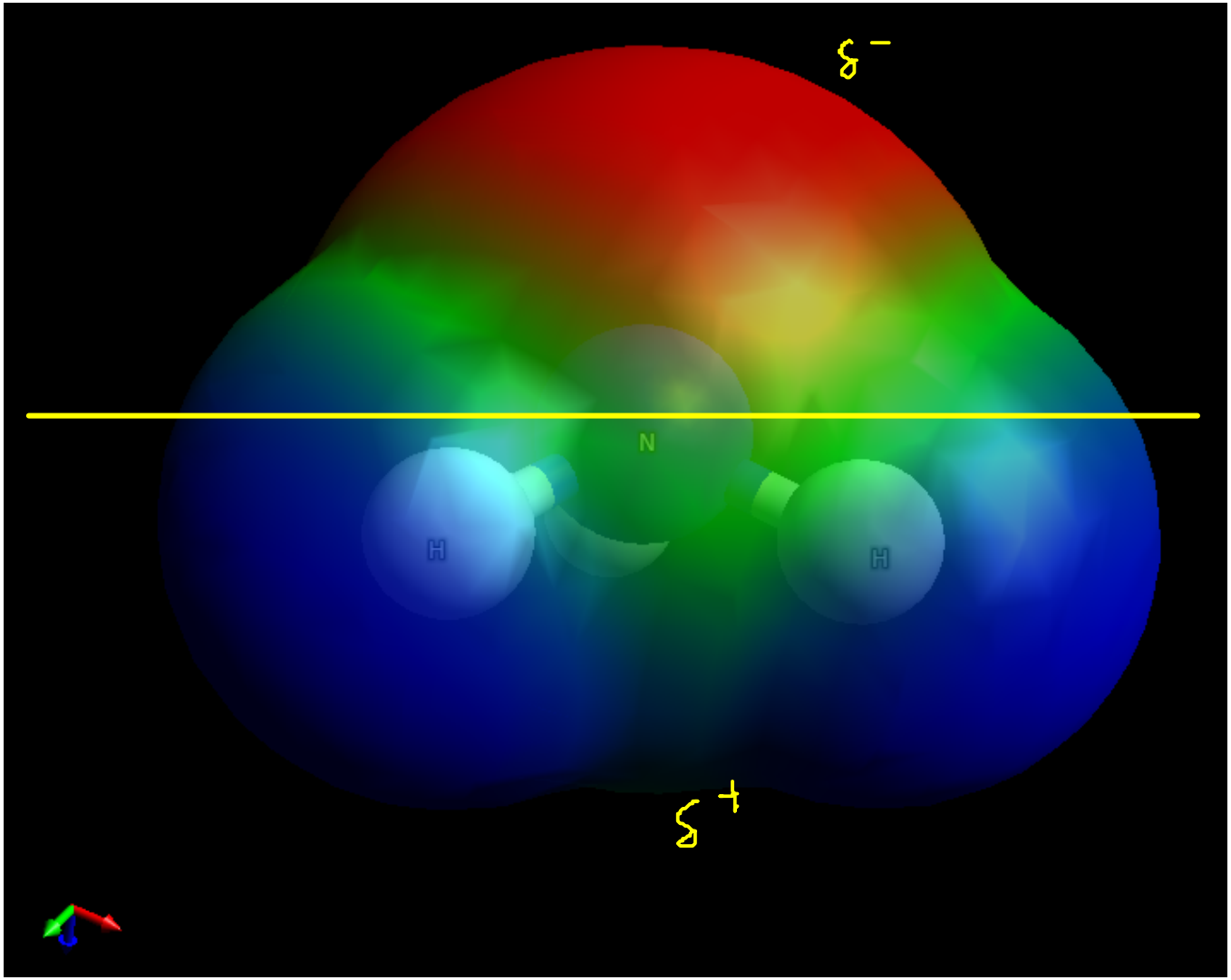
H_2CO



oxygen "side",
slightly negative

hydrogen "side",
slightly positive

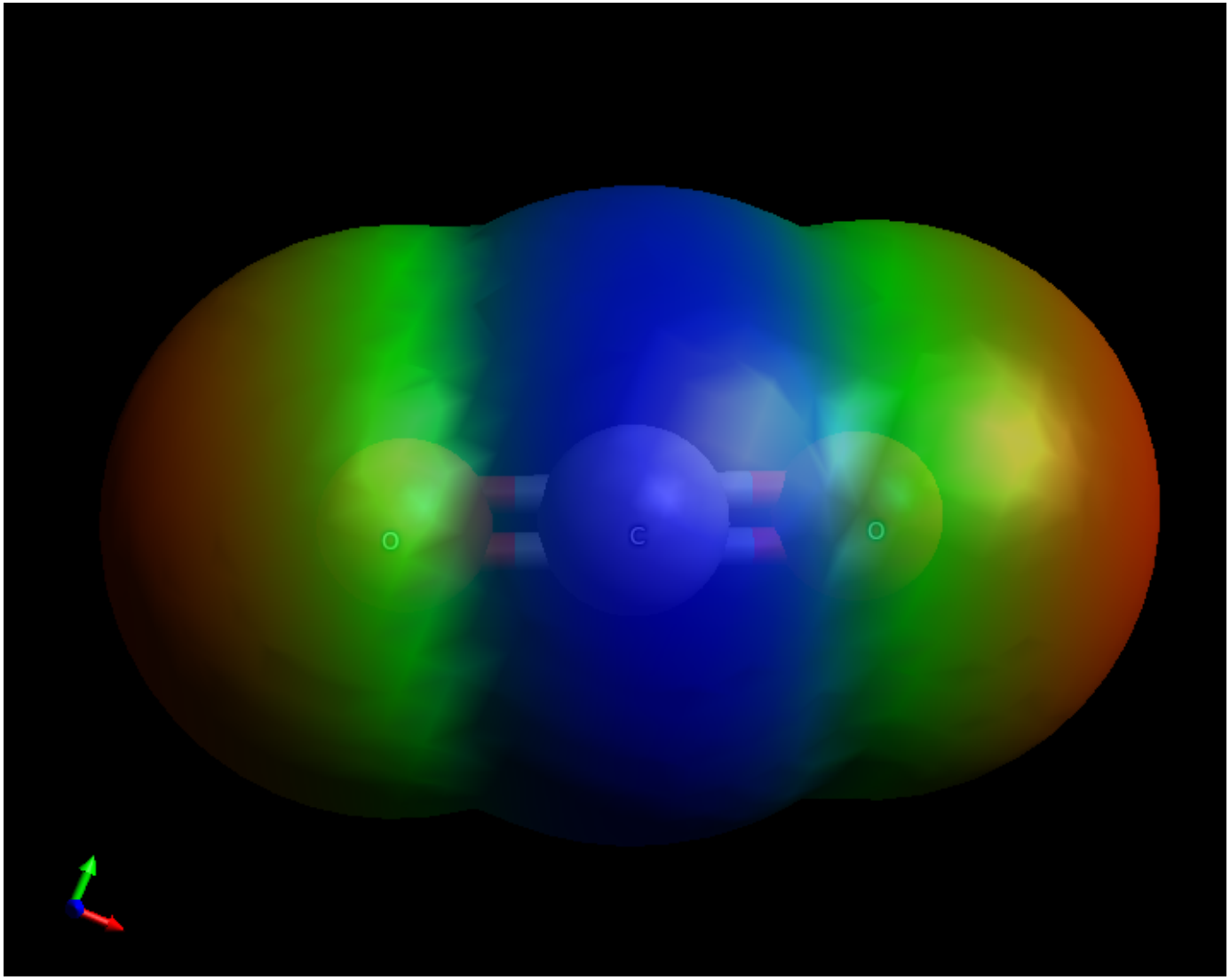
NH_3



nitrogen "side"
slightly negative

hydrogen "side"
slightly positive

CO_2



This molecule is NONPOLAR. No positive "side" or negative "side"