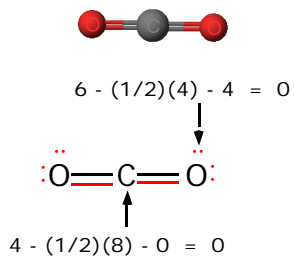


## Formal Atom Charges 1

- Atoms in molecules often bear a charge (+ or -).
- The predominant resonance structure of a molecule is the one with charges as close to 0 as possible.

• **Formal charge = Group no.**  
 - 1/2 (no. bond electrons)  
 - (no. of LP electrons)

## Carbon Dioxide, CO<sub>2</sub> 2

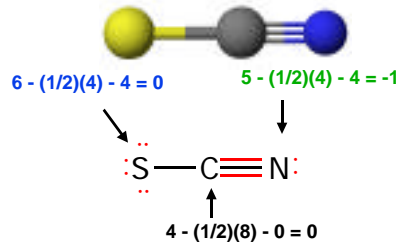


## Partial Charges in CO<sub>2</sub> 3

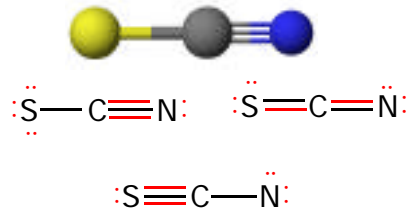


Yellow = negative & red = positive  
 Relative size = relative charge

## Thiocyanate Ion, SCN<sup>-</sup> 4

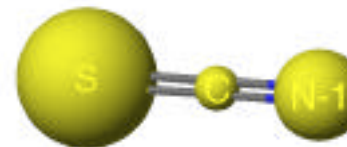


## Thiocyanate Ion, SCN<sup>-</sup> 5



Which is the most important resonance form?

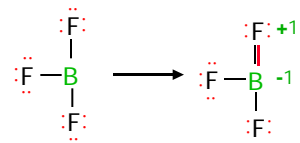
## Partial Charges in SCN<sup>-</sup> 6



All atoms negative — but  
 most on the S

## Boron Trifluoride, $\text{BF}_3$

7



What if we form a B—F double bond to satisfy the B atom octet?

## Partial Charges in $\text{BF}_3$

8



**F is negative  
and B is  
positive**