

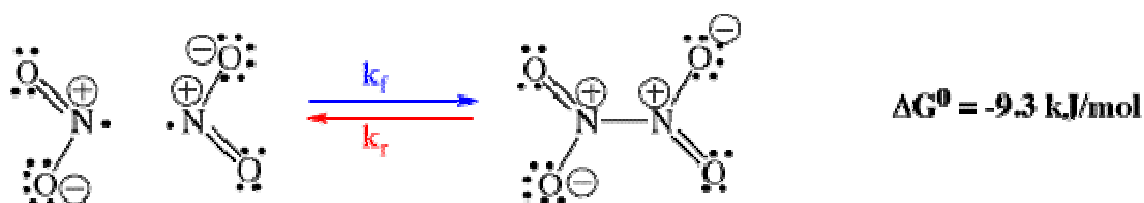
Question#46439 - Chemistry - Inorganic Chemistry

Question:

Nitrogen dioxide can exist as both monomer and dimer. Based on magnetic characteristics, how can you differentiate between the two?

Answer:

Nitrogen dioxide is a compound of nitrogen and oxygen. The molar ratio between N and O is 1:2, the formula of nitrogen dioxide is NO_2 . NO_2 is a monomer form of oxide, and dimer has formula N_2O_4 , it is produced as the result of interaction between two NO_2 molecules. Dimerization process is in equilibrium state:



Lewis formula for NO_2 , depicted on the scheme above, states that nitrogen atom possesses unpaired electron. Due to this phenomena, nitrogen dioxide is a paramagnetic. Also it is bent molecule with C_{2v} point group symmetry.

The process of dimerization lets the molecule of nitrogen dioxide pair its unpaired electron, therefore N_2O_4 doesn't have magnetic moment.

The process have negative Gibbs energy, it is more likely to occur and it is spontaneous.