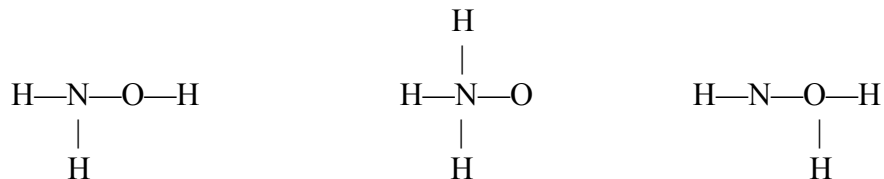


## Predicting Structures and Explaining Reactivity for Inorganic Compounds

Of the three possible bonding frameworks for hydroxylamine,  $\text{NH}_3\text{O}$ , the one on the left is correct. Complete the three Lewis structures and use formal charges to justify the claim that the first bonding framework is correct.



Draw Lewis structures for the allotropes of oxygen ( $\text{O}_2$  and  $\text{O}_3$ ) and explain why ozone,  $\text{O}_3$ , is more reactive than molecular oxygen,  $\text{O}_2$ .

The formate ion,  $\text{HCO}_2^-$ , and nitrous acid,  $\text{HNO}_2$ , are isoelectronic because they have the same number of valence electrons in their Lewis structures. Their bonding frameworks, however, are quite different; for one ion the hydrogen is bound to an oxygen and for the other ion the hydrogen is not bound to an oxygen. Find the best Lewis structure for each ion and show that the bonding frameworks are indeed different.

Draw the resonance structures for  $\text{N}_2\text{O}$  (all possibilities must contain a N-N single, double, or triple bond). Which resonance structure is the most important? Is this consistent with the observation that when  $\text{N}_2\text{O}$  is chemically reduced in the presence of acid the products are  $\text{N}_2$  and  $\text{H}_2\text{O}$ ? Explain.

