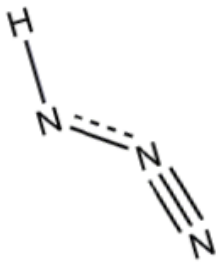
Answer on Question #54618 – Chemistry – Inorganic Chemistry

Question:

What is hydrazoic acid? Why are the ionic azides more stable than the covalent azides andhydrazoic acid?

Answer:

Hydrazoic acid is hydrogen azide, chemical formulaHN_3. It has the following structure:



The difference in stability of ionic and covalent azides is in the structure of the azide anion. Azideanion can take different resonance structures:

$$N^{-}=N^{+}=N^{-} \rightleftarrows N \equiv N^{+}\text{-}N^{2-} \rightleftarrows N^{2-}\text{-}N^{+} \equiv N$$

These structures are symmetric, and the dipole moment is zero. For the covalent azides there is nosuch symmetry and the structure is a dipole (the second structure is dominant):

$$X\text{-}N^{-}\text{-}N^{+} \equiv N \rightleftarrows X\text{-}N=N^{+}=N^{-} \rightleftarrows X\text{-}N^{+} \equiv N^{+}\text{-}N^{2-}$$