Answer on the question #66404, Chemistry / Other

Question:

Explain the formation of dative bond in NH_4Cl?

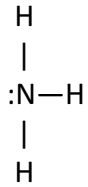
Answer:

Dative bond in NH_4Cl, is the co-ordinate bond. These bonds are formed as covalent bonds, where atoms share the electronic pair. Co-ordinate bond is the type of covalent bonds, where the electronic pair initially belongs to one atom.

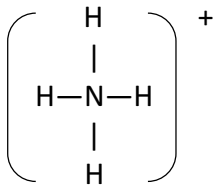
Let's consider the electronic structure of nitrogen and hydrogen elements. The complete electron structure can be presented as:

N (7 electrons): $1S^2 2S^2 2P^3$
H (1 electron): $1S^1$

Thus, normally nitrogen forms 3 covalent bonds with three hydrogen atoms, sharing 3 electron pairs:



As one can see from the Lewis structure of ammonia above, nitrogen atom has a lone electronic pair. Thus, a proton (of H^+) can share this pair within the co-ordinate bond, forming ammonia ion:



This ammonia ion is bonded to chlorine within an ionic bond.