hello everyone welcome to inorganic class of semester five i am dr pritam patil assistant professor pes rsn college of arts and science Farmagudi Ponda Goa today we are going to discuss inter-halogen compounds with respect to methods of preparation and chemical properties outline introduction preparation methods and chemical properties learning outcomes at the end of this module students will be able to explain the method of preparation of inter halogen and explain the chemical properties of inter halogen what are inter-halogen compounds? the halogens react with each other to form inter-halogen compounds most of the inter halogen compounds are halogen fluorides except BrCl ICI, ICI3, IBr etc it can be written as AXn where n is an odd number and X is always lighter and smaller halogen than A X is more electronegative than A more electronegative halogen exhibit negative oxidation state and less electronegative halogen exhibit positive oxidation state since all inter halogens are containing even number of atoms they are diamagnetic in nature the electronegativity of these halogens decreases in the following order here Florine is the most electronegative whereas iodine is least electronegative why inter halogens are more reactive than halogens? inter-halogen compounds have polarity in the bonds whereas halogens have non polar bonds polar bond is easier to break compared to non-polar bond therefore inter-halogen compounds are more reactive for example if we take chlorine molecule and CIF CIF is having electronegativity difference whereas CI2 does not have so

difference whereas CI2 does not have so it is easier to break this CIF bond that's why CIF is more reactive than chlorine molecule this is the classification of inter halogen compounds they are classified into four groups AX type AX3 type AX5 type and AX7 type and these are the examples AX type CIF, BrF, BrCl, ICl and IBr in AX3 type we have CIF3, BrF3, ICl3

in AX5 type we have BrF5, IF5 and in AX7 type we have only one example that is IF7 these are the preparation methods interhalogens can be prepared by different methods in the first method they can be prepared by combination of halogens when we take chlorine and fluorine in equal amount or equi molar proportion we aet CIF and in the second example chlorine plus fluorine when chlorine is taken in excess then we get CIF3 iodine plus chlorine in equimolar proportion will give ICI3 in second method of preparation inter halogens can be prepared from lower inter halogen compounds with the action of halogen molecule so CIF plus fluorine will give CIF3 BrF plus fluorine will give BrF5 and IF5 plus fluorine will give IF7 molecule then third method inter-halogen compounds can be prepared by using salts so here palladium iodide plus fluorine will give IF7 iodine plus Silverfluoride will give IF5 and potassium chloride plus fluorine will give CIF5 so these are the methods of preparation of inter halogen compounds let's see the chemical properties of inter halogen compounds interhalogen compounds they are good fluorinating agent they fluorinate inorganic compound so CIF3 plus magnesium oxide will give magnesium fluoride these also react with water giving HF and IOF5 when it is reacted with IF7 the reaction with the water it gives this reaction third reaction is with silica BrF5 plus silica gives SiF4, BrF3 and oxygen it also reacts with cesium fluoride giving a complex cesium plus IF8 minus now these interhalogen compounds they self ionize and therefore they conduct electricity this is example IF5 on ionization it gives IF4 plus and IF six minus these are the ions so therefore they can conduct electricity these are the references for this module thank you