

Metals and their Compounds

Lecture 8.4

Hard and soft ions and ligands

Demonstration involves Fe^{3+} ion (highly charged and small - therefore HARD)

$[\text{Fe}(\text{H}_2\text{O})_6]^{3+}$ colourless, 6 oxygens from H_2O attached to metal

reacts with thiocyanate NCS^- to give

$\text{Fe}(\text{NCS})_3(\text{H}_2\text{O})_3$ intense red, 3 nitrogens from NCS , 3 oxygens from H_2O

which reacts with F^- (fluoride) to give

$[\text{FeF}_6]^{3-}$ colourless, 6 fluorines

Moral : Fe-O bonds weaker than Fe-N which are weaker than Fe-F bonds.