

- Explain why HClO_4 is a stronger Brønsted acid than HBrO_4 , but HCl is a weaker acid than HBr .

In Group 17 oxyacids, electron density is drawn away from the O atom as the electronegativity of the halogen increases. This in turn draws electron density away from the O–H bond and weakens it. The weaker the O–H bond, the stronger the acid. Cl is more electronegative than Br so HOClO_3 is stronger acid than HOBrO_3 .

In binary acids such as HBr and HCl , the H–Br bond is longer than the H–Cl bond as Br is larger than Cl. The H–Br bond is therefore weaker than the H–Cl bond and HBr is thus a stronger acid than HCl .