Hydrogen Halides

EN of H: 2.1

Hydrogen Fluoride (HF)

EN of F: 4.0

m.p. -83.1°C, b.p. 19.9°C

pKa (aq) 3.17

r(H-F) = 0.92 Å; dipole moment = 1.8D (calcd 1.9)

Hydrogen Chloride (HCl)

EN of Cl: 3.0

m.p. -114.2°C, b.p. -85.0 deg.C

pKa (aq) -7

r(H-Cl) = 1.28 Å; dipole moment = 1.1D (calcd 0.9)

Hydrogen Bromide (HBr)

EN of Br: 2.8

m.p. -86.8°C, b.p. -66.7°C

pKa (aq) -9

r(H-Br) = 1.41 Å; dipole moment = 0.8D (calcd 0.7)

Hydrogen Iodide (HI)

EN of I: 2.5

m.p. -50.8°C, b.p. -35.35°C

pKa (aq) -10

r(H-I) = 1.60 Å; dipole moment = 0.4D (calcd 0.4)

Synthesis

In general HX can be prepared by nonvolatile, nonoxidizing acid on a halide salt.
H_2SO_4 good for HF and HCl; H_3PO_4 good for HBr and HI.

Anomolous Properties of HF

Boiling point.

Acid strength in aqueous solution.

Strong acid in pure liquid state.