REDUCING POWER OF HALIDES

$Cl^- \rightarrow Cl_2$	$2\ Cl^- \rightarrow Cl_2 + 2\ e^-$
$Br^- \rightarrow Br_2$	$2\ Br^- \rightarrow Br_2 + 2\ e^-$
$I^- \rightarrow I_2$	$2\ I^- \rightarrow I_2 + 2\ e^-$

$H_2SO_4 \rightarrow SO_4$	$H_2SO_4 + 2\ H^+ + 2\ e^- \rightarrow SO_2 + 2\ H_2O$
$H_2SO_4 \rightarrow S$	$H_2SO_4 + 6\ H^+ + 6\ e^- \rightarrow S + 4\ H_2O$
$H_2SO_4 \rightarrow H_2S$	$H_2SO_4 + 8\ H^+ + 8\ e^- \rightarrow H_2S + 4\ H_2O$

Halide	Product	Observation	Reaction type	Equation
Cl^-	HCl	White fumes	Acid-base	$H_2SO_4 + KCl \rightarrow HCl + KHSO_4$
Br^-	HBr	White fumes	Acid-base	$H_2SO_4 + KBr \rightarrow HBr + KHSO_4$
	Br_2	Orange fumes	Oxidation of Br^-	$H_2SO_4 + 2\ H^+ + 2\ Br^- \rightarrow Br_2 + SO_2 + 2\ H_2O$
	SO_2	Colourless gas	Reduction of H_2SO_4	$H_2SO_4 + 2\ H^+ + 2\ Br^- \rightarrow Br_2 + SO_2 + 2\ H_2O$
I^-	HI	White fumes	Acid-base	$H_2SO_4 + KI \rightarrow HI + KHSO_4$
	I_2	Purple fumes	Oxidation of I^-	$H_2SO_4 + 2\ H^+ + 2\ I^- \rightarrow I_2 + SO_2 + 2\ H_2O$ $H_2SO_4 + 6\ H^+ + 6\ I^- \rightarrow 3\ I_2 + S + 4\ H_2O$ $H_2SO_4 + 8\ H^+ + 8\ I^- \rightarrow 4\ I_2 + H_2S + 4\ H_2O$
	SO_2	Colourless gas	Reduction of H_2SO_4	$H_2SO_4 + 2\ H^+ + 2\ I^- \rightarrow I_2 + SO_2 + 2\ H_2O$
	S	Yellow solid	Reduction of H_2SO_4	$H_2SO_4 + 6\ H^+ + 6\ I^- \rightarrow 3\ I_2 + S + 4\ H_2O$
	H_2S	Colourless gas (bad egg smell)	Reduction of H_2SO_4	$H_2SO_4 + 8\ H^+ + 8\ I^- \rightarrow 4\ I_2 + H_2S + 4\ H_2O$

Reducing power:

Strongest — **iodide I^-**
bromide Br^-
Weakest — **chloride Cl^-**

Explanation

- Halide ion loses an electron when it reduces the H_2SO_4
- The bigger the halide ion, the easier it is to lose an electron as it is bigger and has more shielding