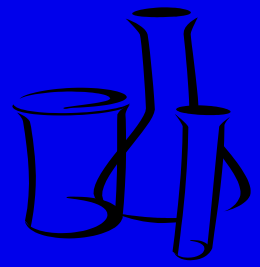

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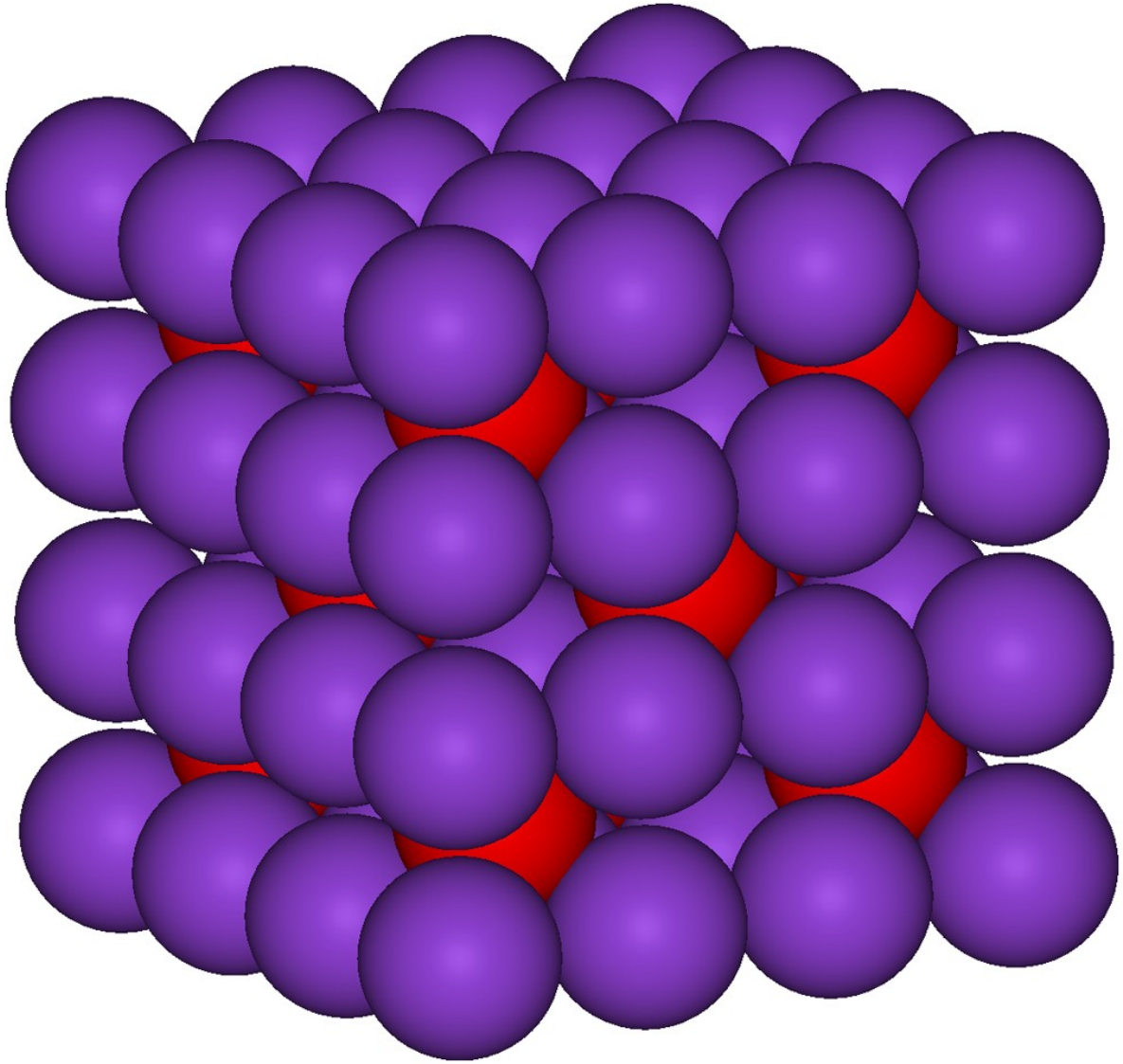
PERIOD 3 OXIDES

Sodium oxide Na_2O

IONIC



Na^+

O^{2-}

mpt 1275°C

Sodium oxide Na_2O

IONIC

+ Water	+ Acids	+ Alkalis

Sodium oxide Na_2O

IONIC

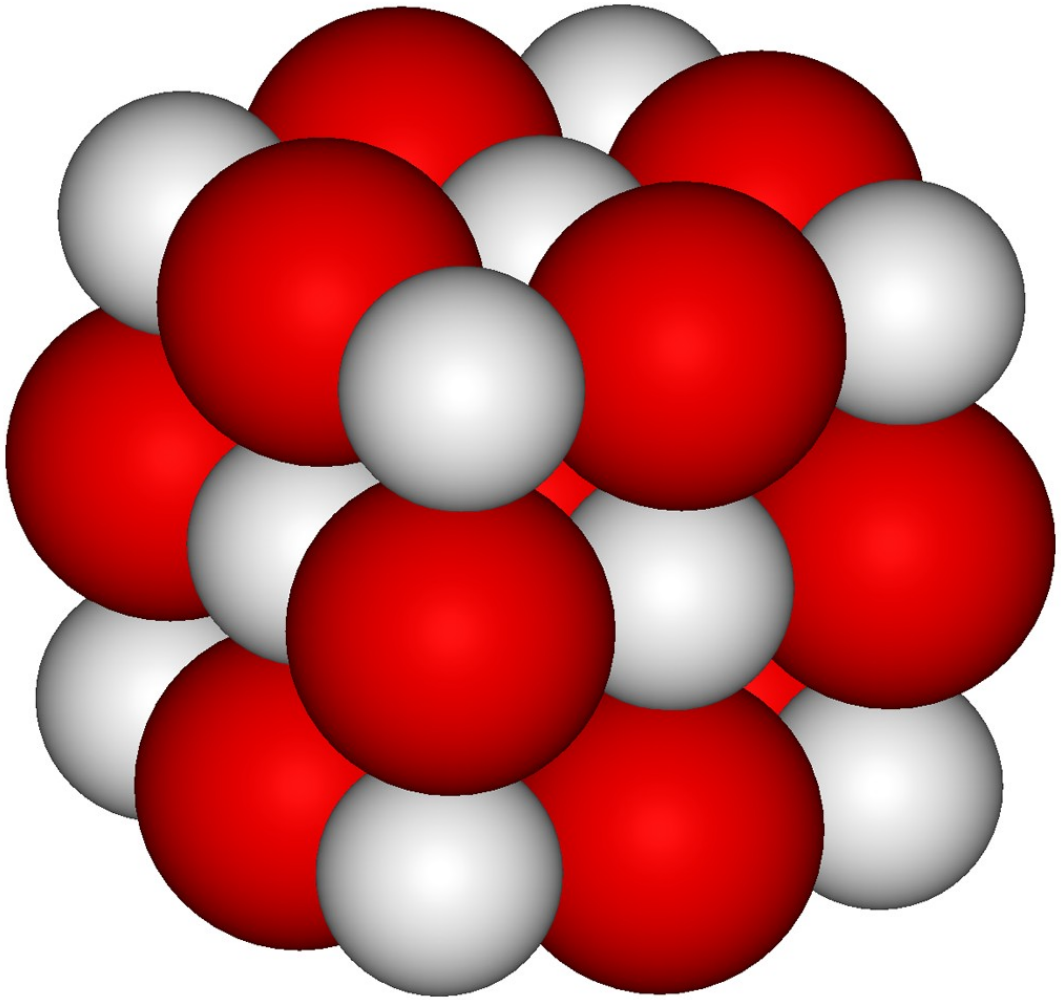
+ Water	+ Acids	+ Alkalis
The Na^+ and O^{2-} ions dissolves in water and then the O^{2-} ions react with water: $O^{2-} + H_2O \rightarrow 2\ OH^-$ "Dissolves" (i.e. dissolves and then reacts with water to form a solution) $Na_2O + H_2O \rightarrow$ 2 NaOH(aq) pH 14		

Sodium oxide Na_2O | BASIC | IONIC

+ Water	+ Acids	+ Alkalis
The Na^+ and O^{2-} ions dissolves in water and then the O^{2-} ions react with water: $O^{2-} + H_2O \rightarrow 2\ OH^-$ "Dissolves" (i.e. dissolves and then reacts with water to form a solution) $Na_2O + H_2O \rightarrow$ 2 NaOH(aq) pH 14	$Na_2O + 2\ H^+ \rightarrow 2\ Na^+ + H_2O$	

Magnesium oxide MgO

IONIC



Mg^{2+}

O^{2-}

mpt 2900°C

Magnesium oxide MgO

IONIC

+ Water	+ Acids	+ Alkalis

Magnesium oxide MgO

IONIC

+ Water	+ Acids	+ Alkalis
"Slightly soluble" (i.e. some dissolves and then reacts with water to form a solution) Some Mg^{2+} and O^{2-} ions dissolve in water (less soluble than Na_2O due to higher lattice enthalpy) and then the O^{2-} ions react with water: $O^{2-} + H_2O \rightarrow 2\ OH^-$ $MgO + H_2O \rightarrow Mg(OH)_2(aq)$ pH 10		

Magnesium oxide MgO | BASIC | IONIC

+ Water	+ Acids	+ Alkalis
"Slightly soluble" (i.e. some dissolves and then reacts with water to form a solution) Some Mg^{2+} and O^{2-} ions dissolve in water (less soluble than Na_2O due to higher lattice enthalpy) and then the O^{2-} ions react with water: $O^{2-} + H_2O \rightarrow 2\ OH^-$ $MgO + H_2O \rightarrow Mg(OH)_2(aq)$ pH 10	$MgO + 2\ H^+ \rightarrow Mg^{2+} + H_2O$	

Aluminium oxide Al_2O_3

IONIC

+ Water	+ Acids	+ Alkalis

Aluminium oxide Al_2O_3

IONIC

+ Water	+ Acids	+ Alkalis
Insoluble due to very high lattice enthalpy		

Aluminium oxide Al_2O_3

IONIC

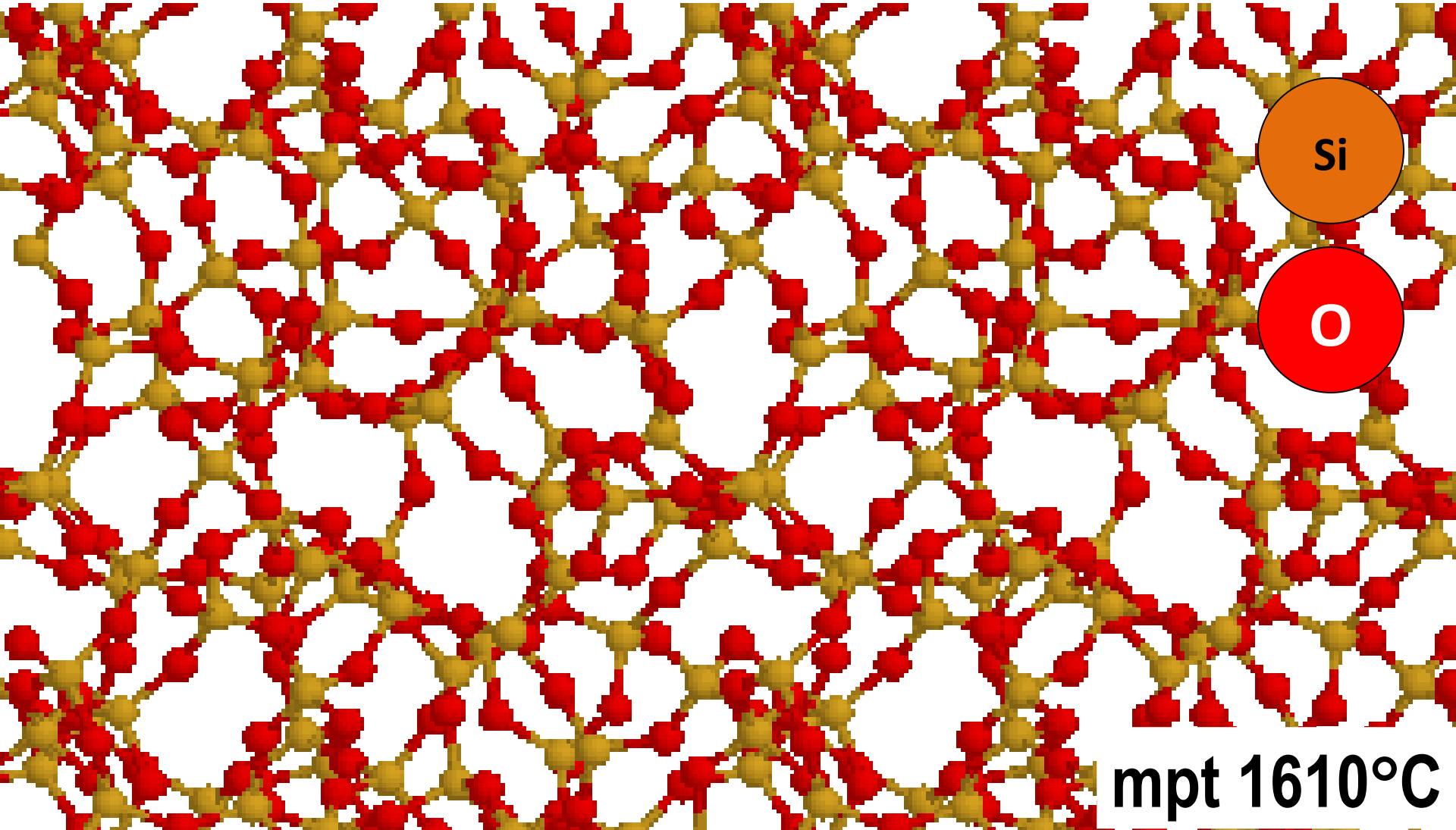
+ Water	+ Acids	+ Alkalis
Insoluble due to very high lattice enthalpy	$Al_2O_3 + 6H^+ \rightarrow 2Al^{3+} + 3H_2O$	

Aluminium oxide Al_2O_3 AMPHOTERIC IONIC

+ Water	+ Acids	+ Alkalis
Insoluble due to very high lattice enthalpy	$Al_2O_3 + 6H^+ \rightarrow 2Al^{3+} + 3H_2O$	$Al_2O_3 + 2OH^- + 3H_2O \rightarrow 2\ Al(OH)_4^-$

Silicon(IV) oxide SiO_2

GIANT COVALENT



mpt 1610°C

Silicon(IV) oxide SiO_2

GIANT COVALENT

+ Water	+ Acids	+ Alkalis

Silicon(IV) oxide SiO_2

GIANT COVALENT

+ Water	+ Acids	+ Alkalis
Insoluble due to lattice of atoms linked by strong covalent bonds that would have to be broken		

Silicon(IV) oxide SiO_2

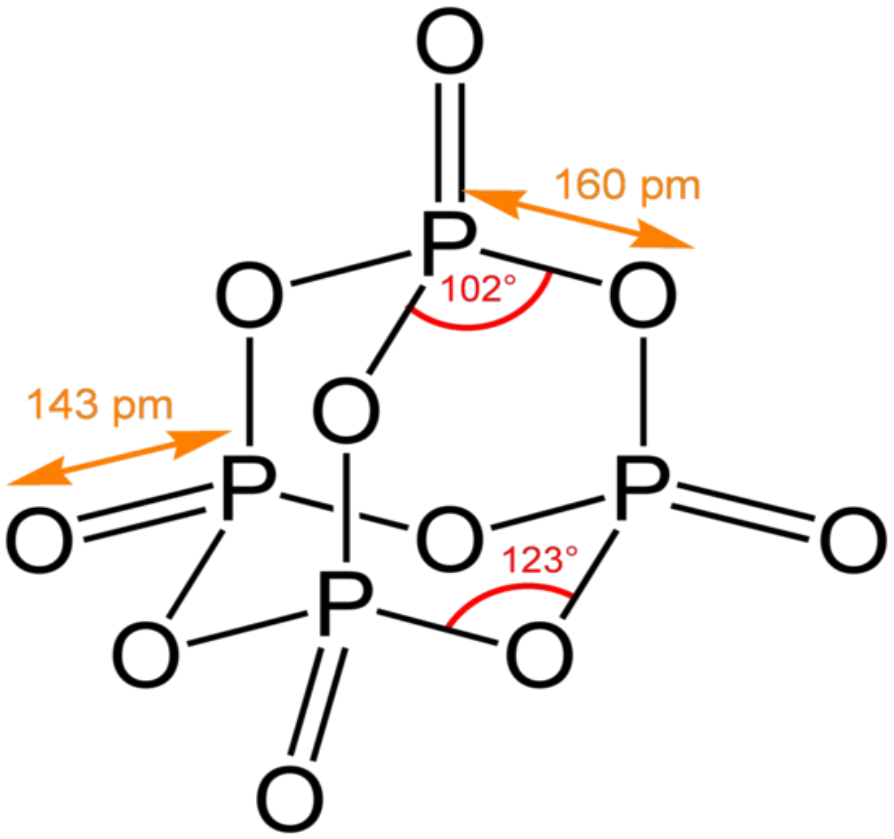
ACIDIC

GIANT COVALENT

+ Water	+ Acids	+ Alkalis
Insoluble due to lattice of atoms linked by strong covalent bonds that would have to be broken		$SiO_2 + 2OH^- \rightarrow SiO_3^{2-} + H_2O$ (must be hot, concentrated NaOH)

Phosphorus oxide P_4O_{10}

MOLECULAR



mpt 580°C

Phosphorus oxide P_4O_{10}

MOLECULAR

+ Water	+ Acids	+ Alkalis

Phosphorus oxide P_4O_{10}

MOLECULAR

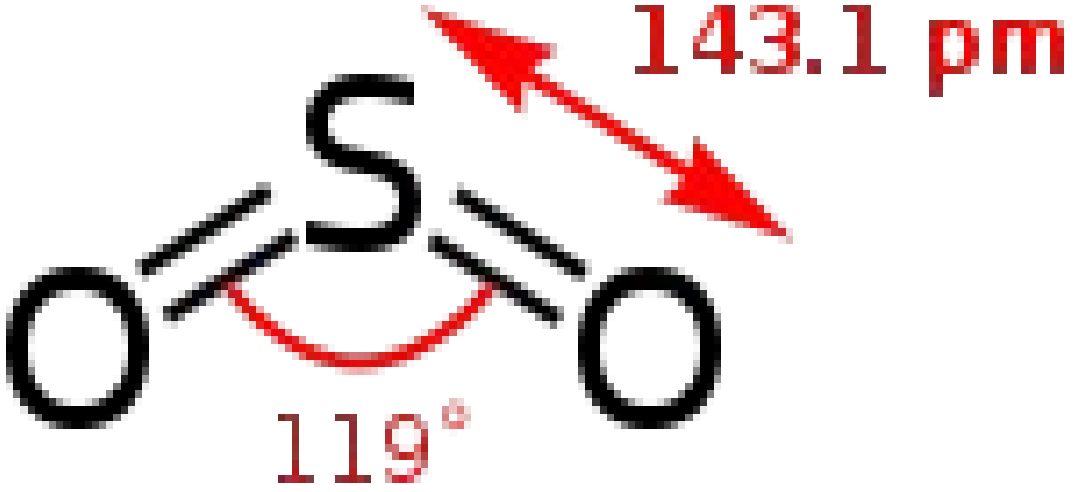
+ Water	+ Acids	+ Alkalis
Reacts violently $P_4O_{10} + 6H_2O \rightarrow 4H_3PO_4$ H_2O molecules attach the d+ P atoms, leading to the release of H^+ ions from the water molecules.		

Phosphorus oxide P_4O_{10} ACIDIC MOLECULAR

+ Water	+ Acids	+ Alkalis
Reacts violently $P_4O_{10} + 6H_2O \rightarrow 4H_3PO_4$ H_2O molecules attach the d+ P atoms, leading to the release of H^+ ions from the water molecules.		$P_4O_{10} + 12OH^- \rightarrow 4PO_4^{3-} + 6\ H_2O$

Sulfur(IV) oxide SO_2

MOLECULAR



mpt -75°C

Sulfur(IV) oxide SO_2

MOLECULAR

+ Water	+ Acids	+ Alkalis

Sulfur(IV) oxide SO_2

MOLECULAR

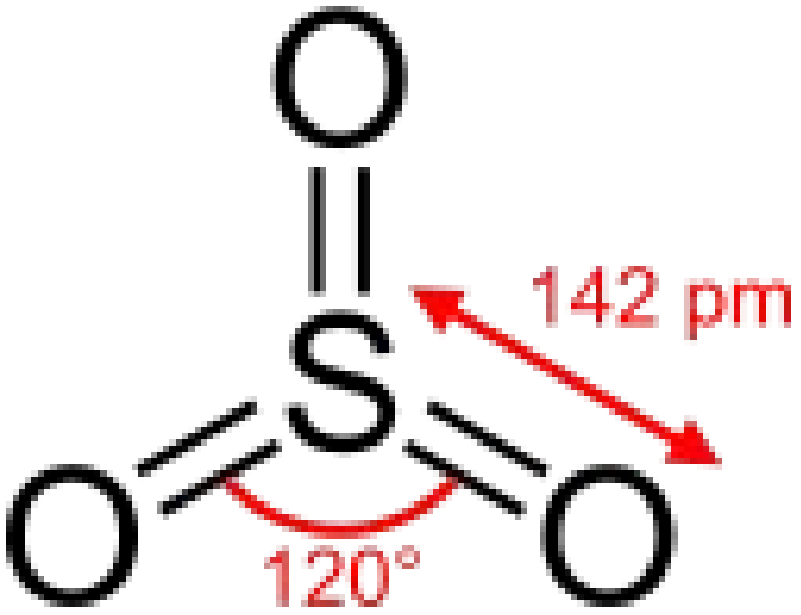
+ Water	+ Acids	+ Alkalis
"Dissolves" (i.e. dissolves and then reacts with water to form a solution $SO_2 + H_2O \rightarrow H_2SO_3$ H_2O molecules attach the d+ S atoms, leading to the release of H^+ ions from the water molecules.		

Sulfur(IV) oxide SO_2 ACIDIC MOLECULAR

+ Water	+ Acids	+ Alkalis
"Dissolves" (i.e. dissolves and then reacts with water to form a solution $SO_2 + H_2O \rightarrow H_2SO_3$ H_2O molecules attach the d+ S atoms, leading to the release of H^+ ions from the water molecules.		$SO_2 + 2OH^- \rightarrow SO_3^{2-} + H_2O$

Sulfur(VI) oxide SO_3

MOLECULAR



mpt 17°C

Sulfur(VI) oxide SO_3

MOLECULAR

+ Water	+ Acids	+ Alkalis

Sulfur(VI) oxide SO_3

MOLECULAR

+ Water	+ Acids	+ Alkalis
Reacts violently $SO_3 + H_2O \rightarrow H_2SO_4$ H_2O molecules attach the $\delta+$ S atoms, leading to the release of H^+ ions from the water molecules. **pH 0**		

Sulfur(VI) oxide SO_3

ACIDIC

MOLECULAR

+ Water	+ Acids	+ Alkalis
Reacts violently $SO_3 + H_2O \rightarrow H_2SO_4$ H_2O molecules attach the $\delta+$ S atoms, leading to the release of H^+ ions from the water molecules. **pH 0**		$SO_3 + 2OH^- \rightarrow SO_4^{2-} + H_2O$