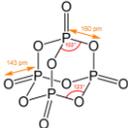
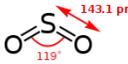
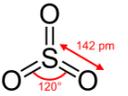




# PERIOD 3 OXIDES

Oxide	Mpt (°C)	Structure & comments	Reaction with water			Reaction with acids	Reaction with alkalis	Nature of oxide
			What happens	Equation & comments	pH			
Na <sub>2</sub> O	1275 (solid)	Ionic	"Dissolves" (i.e. dissolves and then reacts with water to form a solution)	Na <sub>2</sub> O + H <sub>2</sub> O → 2NaOH(aq) The Na <sup>+</sup> and O <sup>2-</sup> ions dissolve in water and then the O <sup>2-</sup> ions react with water: O <sup>2-</sup> + H <sub>2</sub> O → 2 OH <sup>-</sup>	14	Na <sub>2</sub> O + 2 H <sup>+</sup> → 2Na <sup>+</sup> + H <sub>2</sub> O		basic
MgO	2900 (solid)	Ionic (higher melting point than Na <sub>2</sub> O as the Mg <sup>2+</sup> ions are smaller and higher charged than Na <sup>+</sup> )	"Slightly soluble" (i.e. some dissolves and then reacts with water to form a solution)	MgO + H <sub>2</sub> O → Mg(OH) <sub>2</sub> (aq) Some Mg <sup>2+</sup> & O <sup>2-</sup> ions dissolve in water (less soluble than Na <sub>2</sub> O due to higher lattice enthalpy) and then the O <sup>2-</sup> ions react with water: O <sup>2-</sup> + H <sub>2</sub> O → 2 OH <sup>-</sup>	10	MgO + 2H <sup>+</sup> → Mg <sup>2+</sup> + H <sub>2</sub> O		basic
Al <sub>2</sub> O <sub>3</sub>	2040 (solid)	Ionic (not as high a melting point as expected due to some covalent character due to polarising nature of Al <sup>3+</sup> ions)	Insoluble	Insoluble due to very high lattice enthalpy		Al <sub>2</sub> O <sub>3</sub> + 6H <sup>+</sup> → 2Al <sup>3+</sup> + 3H <sub>2</sub> O	Al <sub>2</sub> O <sub>3</sub> + 2OH <sup>-</sup> + 3H <sub>2</sub> O → 2 Al(OH) <sub>4</sub> <sup>-</sup>	amphoteric
SiO <sub>2</sub>	1610 (solid)	Giant covalent	Insoluble	Insoluble due to lattice of atoms linked by strong covalent bonds that would have to be broken			SiO <sub>2</sub> + 2OH <sup>-</sup> → SiO <sub>3</sub> <sup>2-</sup> + H <sub>2</sub> O (must be hot, concentrated NaOH)	acidic
P <sub>4</sub> O <sub>10</sub>	580 (solid)	Simple molecular (but quite a big molecule) 	Reacts violently	P <sub>4</sub> O <sub>10</sub> + 6H <sub>2</sub> O → 4H <sub>3</sub> PO <sub>4</sub> H <sub>2</sub> O molecules attach the δ+ P atoms, leading to the release of H <sup>+</sup> ions from the water molecules.	0		P <sub>4</sub> O <sub>10</sub> + 12OH <sup>-</sup> → 4PO <sub>4</sub> <sup>3-</sup> + 6 H <sub>2</sub> O	acidic
SO <sub>2</sub>	-75 (gas)	Simple molecular 	"Dissolves" (i.e. dissolves and then reacts with water to form a solution)	SO <sub>2</sub> + H <sub>2</sub> O → H <sub>2</sub> SO <sub>3</sub> H <sub>2</sub> O molecules attach the δ+ S atoms, leading to the release of H <sup>+</sup> ions from the water molecules.	3		SO <sub>2</sub> + 2OH <sup>-</sup> → SO <sub>3</sub> <sup>2-</sup> + H <sub>2</sub> O	acidic
SO <sub>3</sub>	17 (liquid?)	Simple molecular 	Reacts violently	SO <sub>3</sub> + H <sub>2</sub> O → H <sub>2</sub> SO <sub>4</sub> H <sub>2</sub> O molecules attach the δ+ S atoms, leading to the release of H <sup>+</sup> ions from the water molecules.	0		SO <sub>3</sub> + 2OH <sup>-</sup> → SO <sub>4</sub> <sup>2-</sup> + H <sub>2</sub> O	acidic