

Period 3 Elements Knowledge organiser

1. Keywords

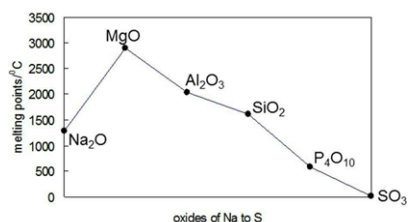
Amphoteric: able to react both as a base and as an acid.

4. Reactivity of Period 3 oxides with acids/bases

Na ₂ O	Na ₂ O(s) + 2HCl(aq) → 2NaCl(aq) + H ₂ O(l)	Alkali
MgO	MgO(s) + 2HCl(aq) → MgCl ₂ (aq) + H ₂ O(l)	Alkali
Al ₂ O ₃	Al ₂ O ₃ (s) + 6HCl(aq) → 2AlCl ₃ (aq) + 3H ₂ O(l)	Amphoteric
	Al ₂ O ₃ (s) + 2NaOH(aq) + 3H ₂ O(l) → 2NaAl(OH) ₄ (aq)	
SiO ₂	SiO ₂ (s) + 2NaOH(aq) → 2Na ₂ SiO ₃ (aq) + H ₂ O(l)	Weak acid
P ₄ O ₁₀	P ₄ O ₁₀ (s) + 12NaOH(aq) → 4Na ₃ PO ₄ (aq) + 6H ₂ O(l)	Acid
SO ₂	SO ₂ (g) + 2NaOH(aq) → Na ₂ SO ₃ (aq) + H ₂ O(l)	Acid

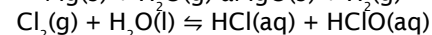
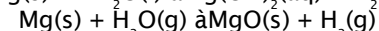
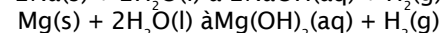
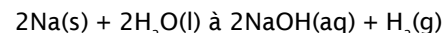
5. Reactivity of Period 3 oxides with water

Na ₂ O	Na ₂ O(s) + H ₂ O(l) → 2NaOH(aq)	pH = 14
MgO	MgO(s) + H ₂ O(l) → Mg(OH) ₂ (aq)	pH = 9
Al ₂ O ₃	Insoluble no reaction	pH = 7
SiO ₂	Insoluble	pH = 7
P ₄ O ₁₀	P ₄ O ₁₀ (s) + 6H ₂ O(l) → 4H ₃ PO ₄ (aq)	pH = 1-2
SO ₂	SO ₂ (g) + H ₂ O(l) → H ₂ SO ₃ (aq)	pH = 2-3
SO ₃	SO ₃ (g) + H ₂ O(l) → H ₂ SO ₄ (aq)	pH = 0-1



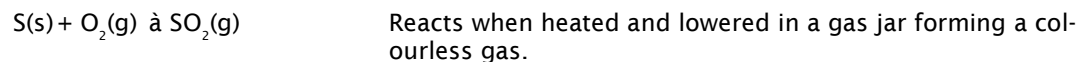
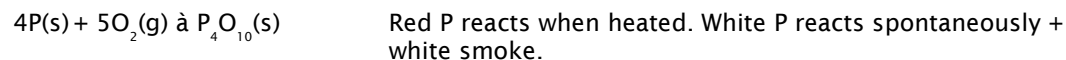
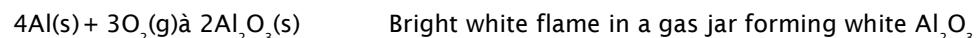
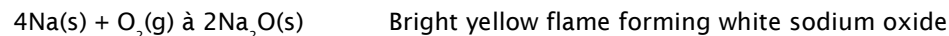
2. Reactivity

Reactivity with water (only Na, Mg, Cl₂):



Faster with steam

Reactivity with oxygen:



3. Period 3 oxides melting points

Na₂O/1548 K Ionic structure = high melting points.

MgO/ 3125K Ionic structure = high melting points. Smaller and more highly charged than Na giving a stronger attraction to the oxygen ions

Al₂O₃ /2345K Ionic structure with covalent character. Very high charge density on the small Al

SiO₂/1883K Giant covalent structure. Strong covalent bonds Si-O.

P₄O₁₀ /573K Simple molecular compounds = low melting points.

SO₃/290K Simple molecular compounds/weak intermolecular forces = low melting points

SO₂/200K Simple molecular compounds/weak intermolecular forces = low melting points