

The Third Period Oxides

Formula	Na ₂ O	MgO	Al ₂ O ₃	SiO ₂	P ₄ O ₁₀ (P ₄ O ₆)	SO ₃ (SO ₂)	Cl ₂ O ₇ (Cl ₂ O)
State 25°C	Solid	Solid	Solid	Solid	Solid	Liquid (Gas)	Gas
Melting Point °C	1275	2852	2027	1610	24	17	-92
Boiling Point °C	---	3600	2980	2230	175	45	80
Electrical Conductivity	Good	Good	Good	Very poor	None	None	None
Structure	<-	Ionic	->	Covalent Network		Covalent	
Reaction with water	Forms NaOH (Strong Base)	Forms Mg(OH) ₂ (Weak Base)	No Reaction	No Reaction	Forms H ₃ PO ₄ (Acid)	Forms H ₂ SO ₄ (Strong Acid)	Forms HClO ₃ (Strong Acid)
Nature of the Oxide	Basic	Basic	Amphoteric	Acidic	Acidic	Acidic	Acidic

- Oxides of metals react with water to form basic solutions
- Oxides of non-metals react with water to form acids

The Third Period Chlorides

Formula	NaCl	MgCl ₂	AlCl ₃ Al ₂ Cl ₆	SiCl ₄	PCl ₃ (PCl ₅)	S ₂ Cl ₂	Cl ₂
State 25°C	Solid	Solid	Solid	Liquid	Liquid (Solid)	Liquid	Gas
Melting Point °C	801	714	178 Sublimes	-70	-112	-80	-101
Boiling Point °C	1413	1412	---	58	76	136	-35
Electrical Conductivity	Good	Good	Poor	None	None	None	None
Bonding	Ionic	Ionic	Covalent	Covalent	Covalent	→	→
Reaction with Water	Dissolves easily	Dissolves	Fumes	and	Produces	HCl	
Nature of water solution	Neutral	Weakly Acidic	Acidic	Acidic	Acidic	Acidic	Acidic

- NaCl and MgCl₂ are ionic compounds. The others are covalent
- NaCl is neutral when dissolved in water. MgCl₂ is weakly acidic.
- All other chlorides, including Al₂Cl₆, react vigorously with water to produce hydrochloric acid and fumes of hydrogen chloride:



- Chlorine with itself in water:

