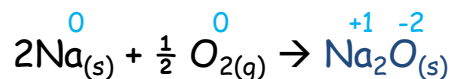
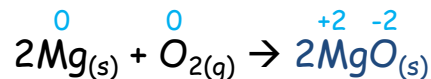


Sodium + Oxygen



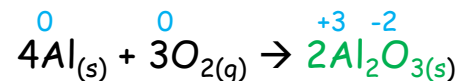
Sodium burns with yellow flame
Sodium oxide is a white solid

Magnesium + Oxygen



Magnesium burns with a bright white flame.
Magnesium oxide is a white solid

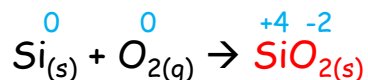
Aluminium + Oxygen



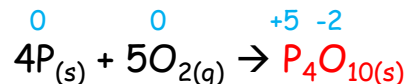
Aluminium* burns brightly.
Aluminium oxide is a white powder.

*Aluminium is coated in aluminium oxide which prevents further reaction and makes aluminium appear unreactive.

Silicon + Oxygen



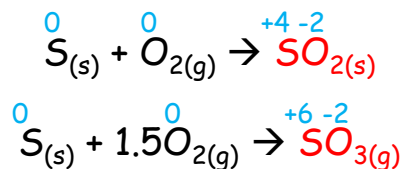
Phosphorus + Oxygen



White phosphorus* ignites in air. White smoke of the oxide is produced.

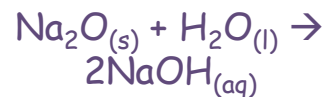
White and red phosphorus are allotropes of phosphorus. Red phosphorus must be heated first.

Sulfur + Oxygen



Sulfur is heated first; then burns in oxygen with a blue flame. SO_2/SO_3 are colourless and acidic.

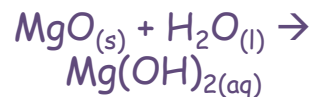
Na₂O + Water



Vigorous reaction;
NaOH very soluble

pH (NaOH) = 14

MgO + Water



Mg(OH)₂ sparingly
soluble

pH (Mg(OH)₂) =
9/10

Al₂O₃ + Water

No reaction
Aluminium oxide is
insoluble in water

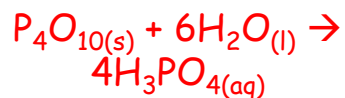
pH = 7

SiO₂ + Water

No reaction
Silicon dioxide is
insoluble in water

pH = 7

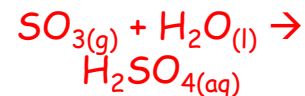
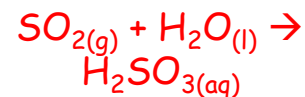
P₄O₁₀ + Water



Violent reaction
Phosphoric acid
very soluble

pH(H₃PO₄) = 0

SO₂/SO₃ + Water



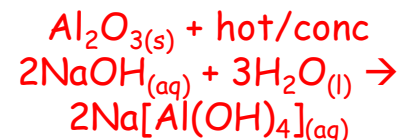
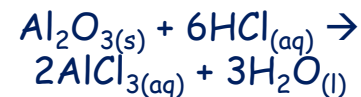
H₂SO₃ moderately
soluble; pH = 3
H₂SO₄ very soluble;
pH = 0



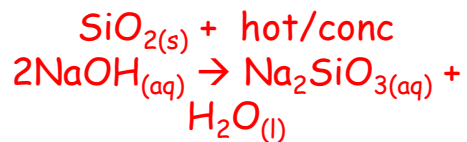
Na₂O is a basic oxide



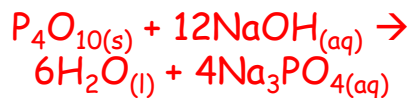
MgO is a basic oxide



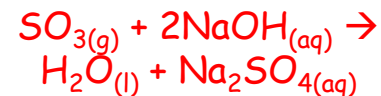
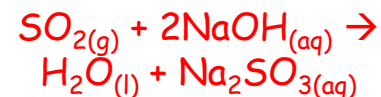
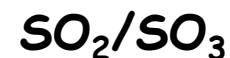
Al₂O₃ is an amphoteric oxide



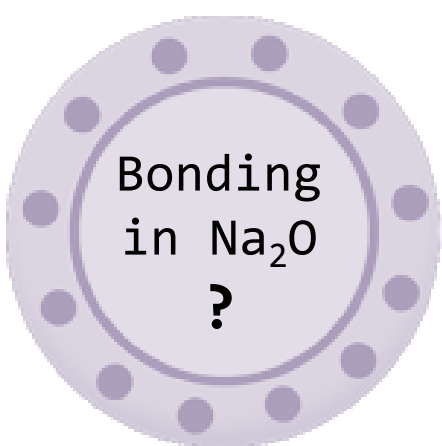
SiO₂ is an acidic oxide and forms sodium silicate



P₄O₁₀ is an acidic oxide




SO₂/SO₃ are acidic oxides



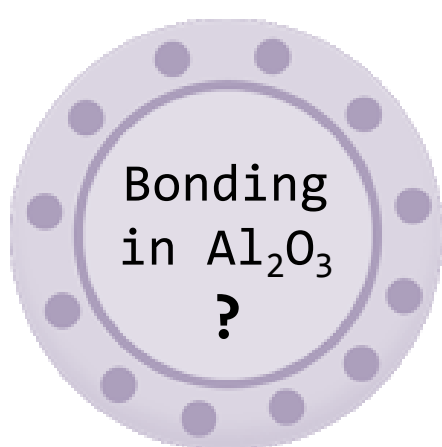
Bonding
in Na_2O
?

Ionic



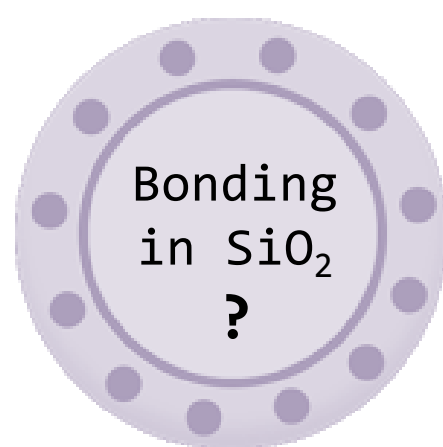
Bonding
in MgO
?

Ionic



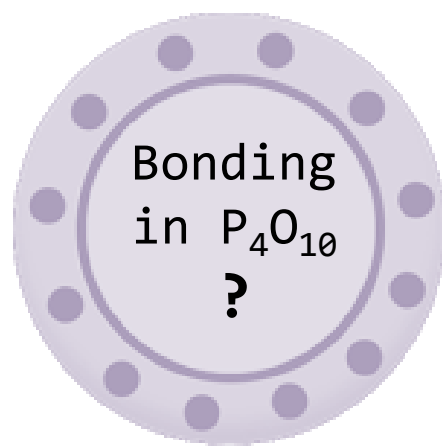
Bonding
in Al_2O_3
?

Ionic-
Covalent



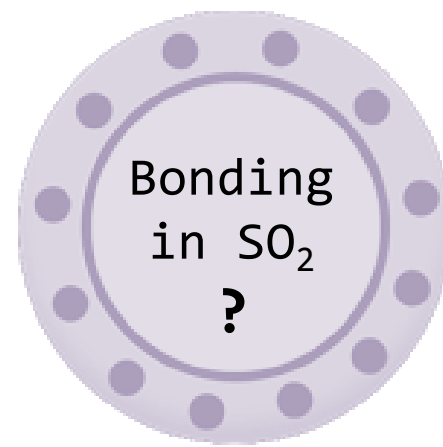
Bonding
in SiO_2
?

Covalent



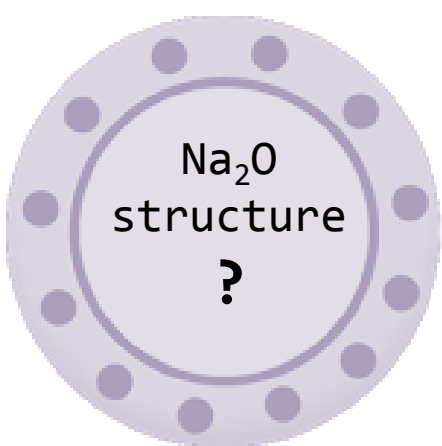
Bonding
in P_4O_{10}
?

Covalent



Bonding
in SO_2
?

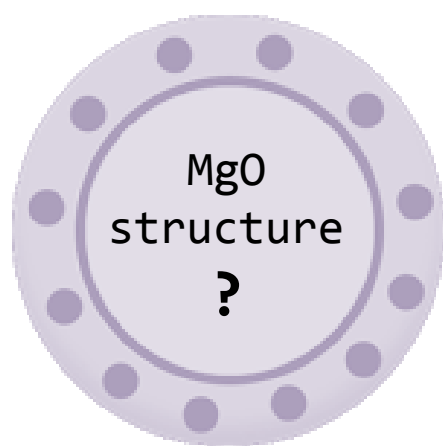
Covalent



Na_2O
structure
?



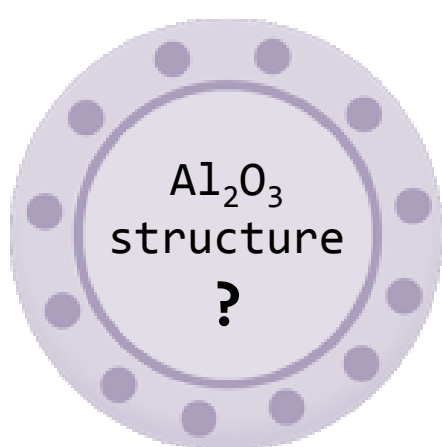
Giant
lattice



MgO
structure
?



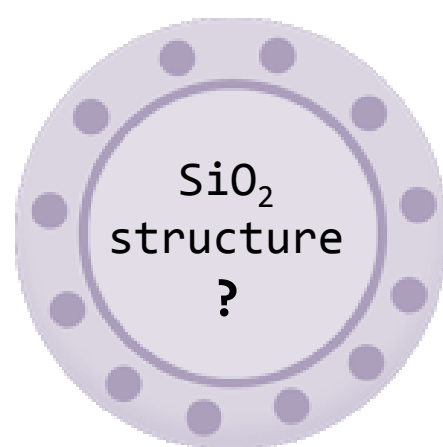
Giant
lattice



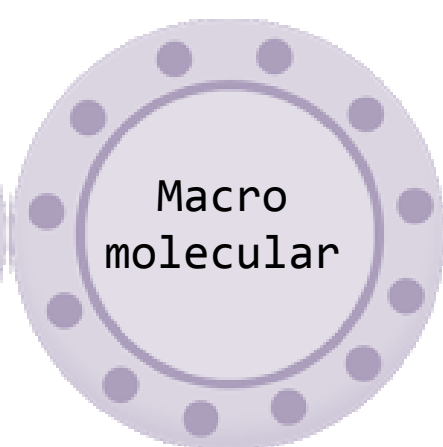
Al_2O_3
structure
?



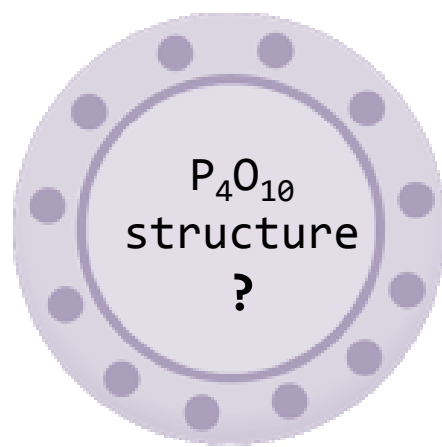
Giant
lattice



SiO_2
structure
?



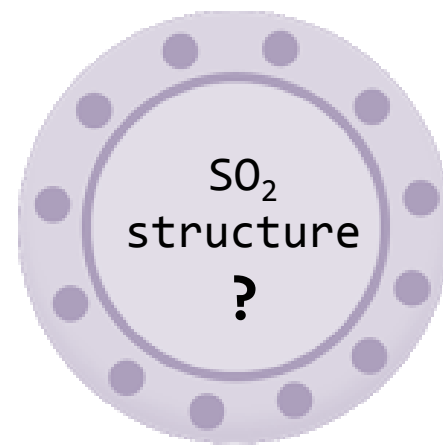
Macro
molecular



P_4O_{10}
structure
?



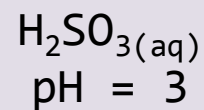
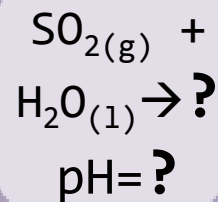
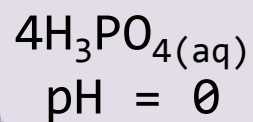
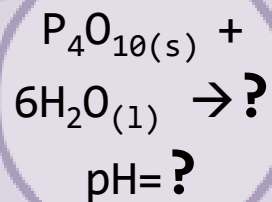
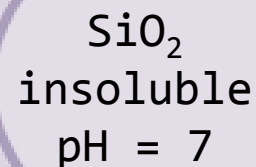
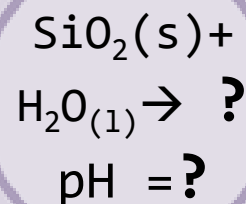
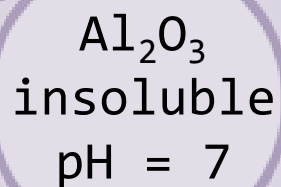
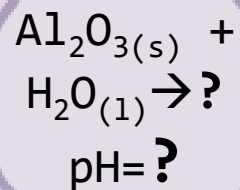
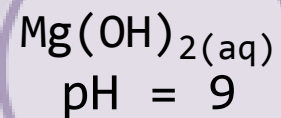
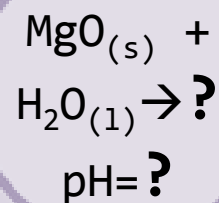
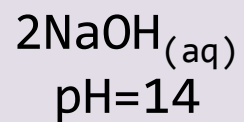
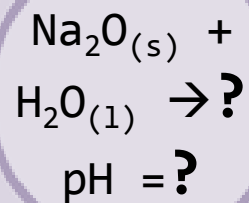
Molecular



SO_2
structure
?



Molecular



$\text{Na}_2\text{O}_{(s)}$
formation
equation
?

$2\text{Na}_{(s)} +$
 $\frac{1}{2} \text{O}_{2(g)}$
Yellow
flame

$\text{MgO}_{(s)}$
formation
equation
?

$\text{Mg}_{(s)} +$
 $\frac{1}{2} \text{O}_{2(g)}$
White flame
White smoke

$\text{Al}_2\text{O}_{3(s)}$
formation
equation
?

$2\text{Al}_{(s)} +$
 $1.5\text{O}_{2(g)}$
White flame

$\text{SO}_{2(g)}$
formation
equation
?

$\text{S}_{(s)} + \text{O}_2$
blue flame
 $(\text{SO}_{2(g)} + \frac{1}{2} \text{O}_{2(g)})$
 $\rightarrow \text{SO}_{3(g)}$

$\text{P}_4\text{O}_{10(s)}$
formation
equation
?

$\text{P}_{4(s)} +$
 $5\text{O}_{2(g)}$
white flame

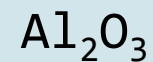
$\text{SO}_{3(g)} +$
 $\text{H}_2\text{O}_{(l)} \rightarrow ?$
pH=?

$\text{H}_2\text{SO}_{4(aq)}$
pH = 0

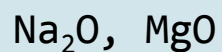
What is the
definition of
amphoteric
?

Reacts
with acids
and bases

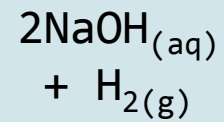
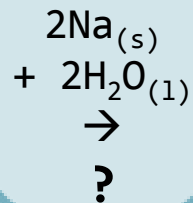
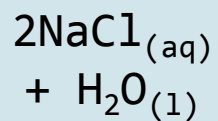
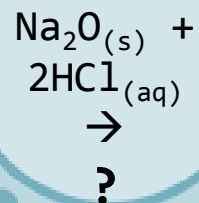
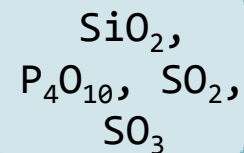
Which oxide
of period 3
is
amphoteric
?

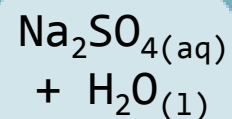
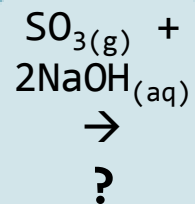
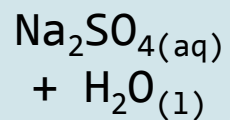
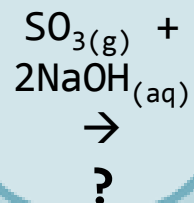
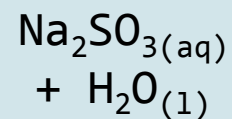
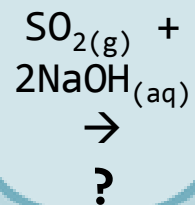
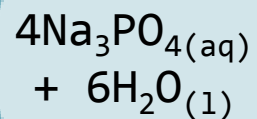
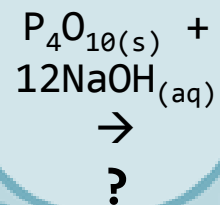
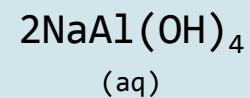
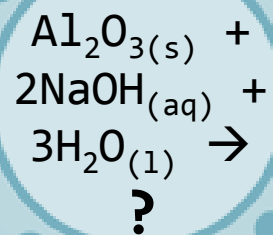
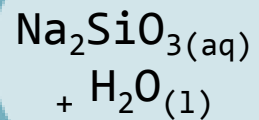
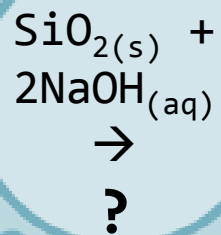


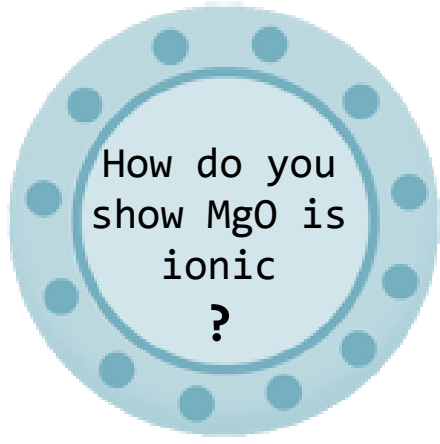
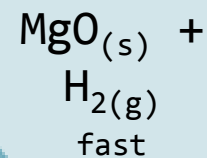
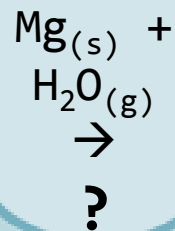
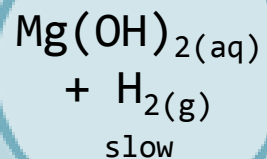
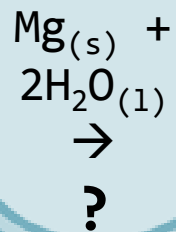
Which oxides
of period 3
are basic
?



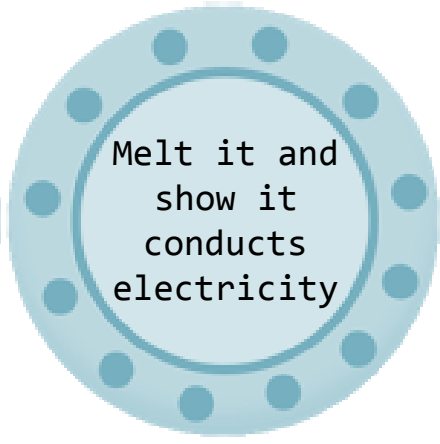
Which oxides
of period 3
are acidic
?



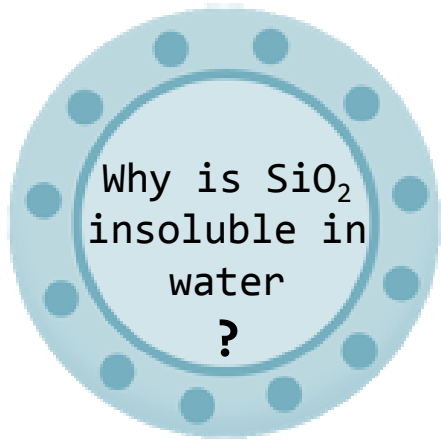




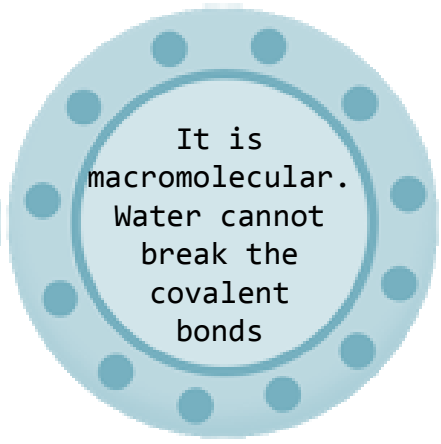
How do you show MgO is ionic?
?



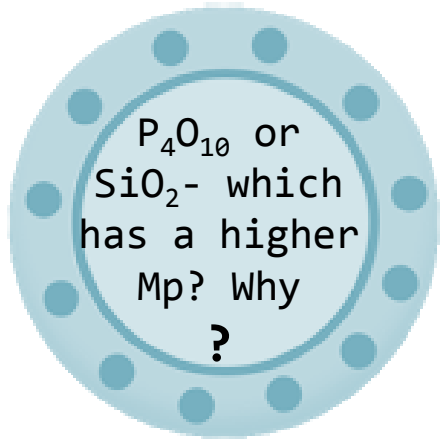
Melt it and show it conducts electricity



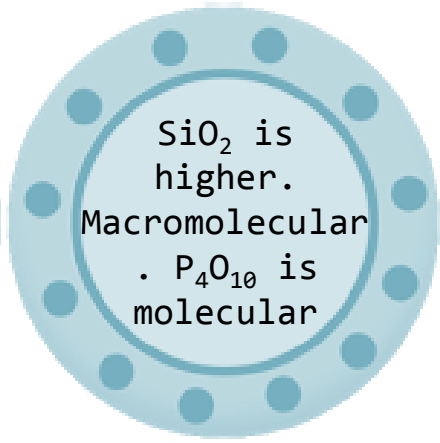
Why is SiO_2 insoluble in water?
?



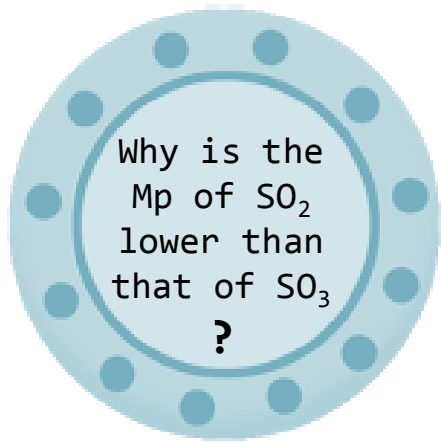
It is macromolecular. Water cannot break the covalent bonds



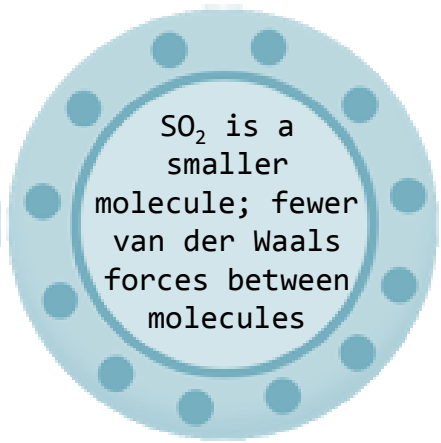
P_4O_{10} or SiO_2 - which has a higher Mp? Why?
?



SiO_2 is higher. Macromolecular. P_4O_{10} is molecular



Why is the Mp of SO_2 lower than that of SO_3 ?
?



SO_2 is a smaller molecule; fewer van der Waals forces between molecules

Why do ionic
oxides have
basic
properties
?

They contain
 O^{2-} ions which
accept H^+ ions
to form OH^-
ions

Why does SO_2
form weakly
acidic
solutions
?

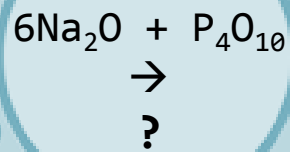
H_2SO_3 is formed
in water which
partially
dissociates

Why is SiO_2 an
acidic oxide
even though it
is insoluble in
water
?

It reacts
with bases

Why is white
phosphorus
stored under
water
?

To stop it
reacting with
oxygen in
the air



Acid-Base
reaction:
 $4Na_3PO_4$

Why is Al_2O_3
resistant to
corrosion
?

It is inert

