

Bonding of the period 3 oxides

1) Describe and explain the trend in the bonding of the oxides across period 3.

2) Describe the trend in acid-base character of the period 3 oxides.

3) Write equations for the reactions of Na, Mg, S, P and NO₂ with water.

4) What property is used to classify elements as metallic?

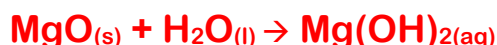
5) Describe and explain the trend in metallic character across a period and down a group.

Answers:

1) The bonding changes from ionic to covalent across period 3. The type of bonding is related to the difference in electronegativity between oxygen and the group 3 element. A difference of greater than 1.8 units on the Pauling scale indicates an ionic bond. As the difference in electronegativity decreases, the bonding changes to covalent.

2) Na and Mg form basic oxides, Al is amphoteric and the remaining elements (Si, P, S and Cl) form acidic oxides.

3) Basic:



Acidic:



4) The ease at which they lose electrons to form positive ions. Metals tend to have low ionisation energies which means the outer electrons are easy to remove.

5) Metallic character decreases across a period as nuclear charge increases and atomic radius decreases. Metallic character increases down a group as atomic radius increases and the outer electrons require less energy to remove.