

# AQA Chemistry A-level

## Topic 2.2 - Group 2

### Flashcards

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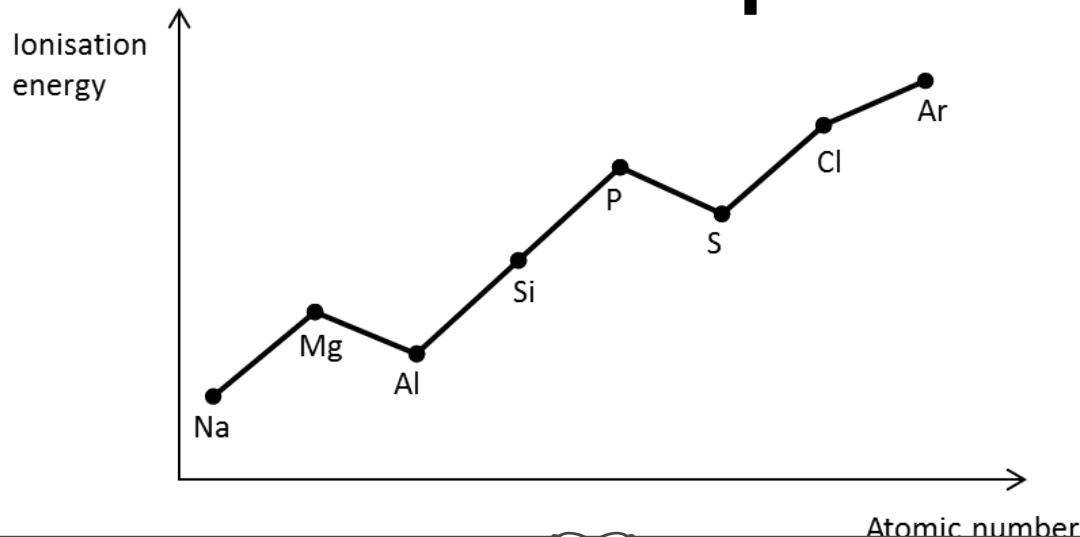
Write an equation for the first ionisation energy of magnesium



Write an equation for the first ionisation energy of magnesium

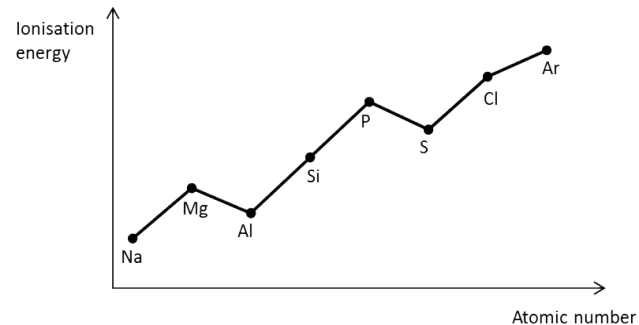


# Explain why this graph is this shape:





# Explain the shape of this graph:



*First Ionisation energy increases across group 3* because of increased nuclear charge, decreased atomic radius and same electron shielding means more energy is needed to remove the first electron.

*Dips at Al* because: outer electron is in a 3p orbital, higher energy than 3s orbital  
→ less energy needed to remove electron

*Dips at S* because one 3p orbital contains two electrons → repulsion between paired electrons → less energy needed to remove one



What happens to the first ionisation energy as you go down group 2? Why?



# What happens to the first ionisation energy as you go down group 2? Why?

Decreases because: number of filled electron shells increases down the group → increased shielding, increased atomic radius → weaker force between outer electron and nucleus → less energy needed to remove electron



How does reactivity with water change as you go down group 2?





# How does reactivity with water change as you go down group 2?

Increases (Mg least → Ba most)

Because outer electrons further from nucleus and more electron shielding, so electrons are lost more easily



Write an equation for the  
reaction of Barium and  
water



Write an equation for the reaction of Barium and water



Write an equation for the reaction of Magnesium and steam.



Write an equation for the reaction of Magnesium and steam.



What is the trend in  
hydroxide solubility down  
group 2?



What is the trend in hydroxide solubility down group 2?

Increases down the group

$\text{Mg}(\text{OH})_2$  is almost insoluble

$\text{Ba}(\text{OH})_2$  creates a strong alkaline solution



What is the trend in  
sulphate solubility down  
group 2?





What is the trend in sulphate solubility down group 2?

Decreases down group

$\text{MgSO}_4$  is soluble

$\text{BaSO}_4$  is insoluble



# What is the trend in melting point down group 2? Why?



What is the trend in melting point down group 2?

Why?

Decreases down group

Because sea of delocalised electrons is further from the positive charge of the nucleus → weaker metallic bonds / forces of attraction which take less energy to weaken



# What is the trend in atomic radius down group 2?



What is the trend in atomic radius down group 2?

Increases as there are more occupied electron shells down the group



Write the equations for the extraction of Titanium using Magnesium.



Write the equations for the extraction of Titanium using Magnesium.



# What are flue gases?





# What are flue gases?

Gases produced by power stations which are harmful to the environment



How can  $\text{CaO}$  or  $\text{CaCO}_3$  be used to remove flue gases?  
Write equations





How can  $\text{CaO}$  or  $\text{CaCO}_3$  be used to remove flue gases? Write equations

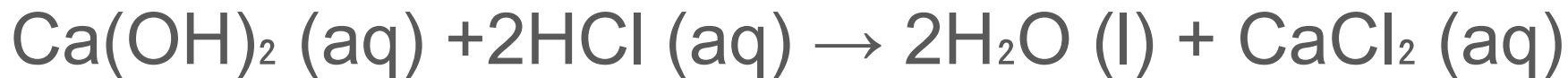


What is  $\text{Ca}(\text{OH})_2$  used for?  
Write an equation related to  
one of its uses



What is  $\text{Ca}(\text{OH})_2$  used for? Write an equation related to one of its uses

Used to neutralise soil



# What is $\text{Mg}(\text{OH})_2$ used for?



What is  $\text{Mg}(\text{OH})_2$  used for?

Milk of magnesia - antacid to treat indigestion, heartburn, wind etc.



What is a use of  $\text{BaSO}_4$ ?  
Why is this safe?





What is a use of  $\text{BaSO}_4$ ? Why is it safe?

In barium meals to outline gut in X-rays

$\text{Ba}^{2+}$  is toxic but is fine as barium sulphate is insoluble



How can  $\text{BaCl}_2$  be used to  
test for sulfate ions?



How can  $\text{BaCl}_2$  be used to test for sulfate ions?

Add your sample with  $\text{HCl}$  first to acidify the solution, then add  $\text{BaCl}_2$ . White precipitate will form if sulfate ions are present.

