

Name:

Class:



Bismuth forms an oxide, Bi₂O₃, which has a giant ionic structure.

Give the formula of the bismuth ion in bismuth oxide.



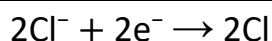
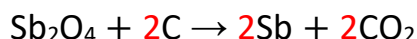
State the formula of a carbonate ion.



State the formula of a sulfate ion.



Balance the following equation



Identify the two mistakes in the ionic half-equation above.

Any **two** of the following:

- Electrons are on wrong side of the equation / electrons should be on right hand side of the equation.
- It should be Cl₂ not 2Cl.

A solution of sulfuric acid has a concentration of 1.2 mol/dm³.

What is this concentration in g/dm³?

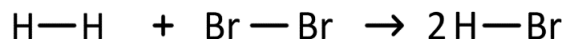
$$\text{g/dm}^3 = \text{mol/dm}^3 \times \text{Mr}$$

$$\text{g/dm}^3 = 1.2 \times 98$$

$$\text{g/dm}^3 = 117.6$$

$$\text{g/dm}^3 = \mathbf{117.6}$$

Hydrogen gas reacts with bromine gas to form hydrogen bromide gas.



Bond	H – H	Br – Br	H – Br
Average bond energy in kJ/mol	436	193	366

Use the values in the table to calculate the enthalpy change for the reaction between hydrogen and bromine.

$$\Sigma(\text{bonds broken}) = 436 + 193 = 629$$

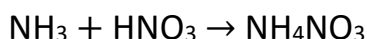
$$\Sigma(\text{bonds made}) = 2 \times 366 = 732$$

$$\Sigma(\text{bonds broken}) - \Sigma(\text{bonds made}) = 629 - 732$$

$$\Delta\text{H} = \mathbf{-103}$$

$$\Delta\text{H} = \mathbf{-103 \text{ kJ/mol}}$$

Ammonium nitrate is made by reacting ammonia with nitric acid.



Calculate the mass of **ammonium nitrate** that could be made from 25.5 tonnes of ammonia. Give your answer to three significant figures.

$$\text{Moles of NH}_3 = \text{Mass} \div \text{Mr}$$

$$\text{Mass of NH}_4\text{NO}_3 = \text{Moles} \times \text{Mr}$$

$$\text{Moles of NH}_3 = 25.5 \div 17 = \frac{3}{2}$$

$$\text{Mass of NH}_4\text{NO}_3 = \frac{3}{2} \times 80$$

$$\text{Mass of ammonium nitrate} = \mathbf{120 \text{ tonnes}}$$