

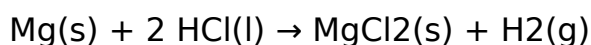
# How much gas is produced

[Science](#), [Chemistry](#)



**INTRODUCTION** The objective of this experiment is to determine the amount of gas produced by a reaction of magnesium with hydrochloric acid. We'll employ the concepts of stoichiometry and the gas laws in order to compute the amount of gas released in this process. Stoichiometry is the quantitative relationship of reactants and products. If it so happens, that in a chemical reaction one or more reactants or products are gases, gas laws must be considered for the calculation. The Ideal Gas Law states that;

where P is the pressure (in atm), V is the volume (in Q), n is the number of moles of gas in the system, T is the temperature (in K) and R is the ideal gas constant, given as 0. 08206 for this situation. The reaction proceeds as follows:



In this experiment one can see that two moles of HCl react with one mole of magnesium to produce one mole of each MgCl<sub>2</sub> and H<sub>2</sub>. Since the product H<sub>2</sub> is gaseous in nature, one can safely assume that if the reaction proceeds at standard temperature and pressure (273K, 1 atm) the volume of one mole of H<sub>2</sub> produced will be 22. 4 litres. Also, one mole of Magnesium will have the mass in grams equal to its molecular weight i. e. 24. Therefore, the mass of magnesium used in the reaction can be converted into the number of moles of magnesium used in the reaction, for e. g.

By using the ideal gas law, one can estimate the volume of the gas once the number of moles of the reactants is computed and the pressure is found out.

## PROCEDURE

The Pressure sensor was used in the experiment to calculate the pressure at

which the volume of gas was to be computed. Other equipments used in the experiment were weighing balance, tongs, measuring cylinder, flask, test tubes, stop-cock, glass-tube etc. The materials used in conducting the experiment were moderately diluted HCL and powdered Magnesium. The diagram of the apparatus is given as follows:

The mass of Magnesium used in the reaction is measured by the weighing scale and the volume of HCL is measured by the measuring cylinder keeping in mind that the pressure required is 0.5 atm. The acid is sufficiently diluted so as to have a smooth reaction as the reaction between Hydrochloric Acid and Magnesium is exothermic i. e. a lot of heat is evolved. Also the gas produced Hydrogen creates a lot of fizz in the flask. When combining the reagents into the flask, care must be taken that none of the gas being produced escapes when adding the reagents together, before sealing the container. Therefore, we add hydrochloric acid in the flask first followed by Magnesium and instant sealing of the flask so as to prevent the escape of any hydrogen gas. The gas is attached to a pressure sensor by a glass tube which records the pressure of the gas. By the help of the Ideal Gas Law and knowing the quantity of Magnesium used in the reaction we can find the volume of Hydrogen produced.

#### REFERENCES

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