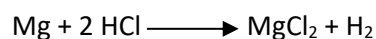


$$\text{Total relative uncertainty} = 0.0021186441 + 0.0047393365 + 0.0010288066 + 0.0120481928 = 0.0199349800$$

DATA PROCESSING AND PRESENTATION:

Equation of the reaction:



$$pV = nRT$$

$$R = \frac{pV}{nT}$$

$$n(\text{H}_2) = n(\text{Mg}) = \frac{m(\text{Mg})}{M(\text{Mg})}$$

$$R = \frac{pVM(\text{Mg})}{Tm(\text{Mg})}$$

$$R = \frac{97.2 \times 0.0498 \times 24.305}{294.3 \times 0.0472} = 8.475283024 \text{ J} \cdot \text{K}^{-1} \cdot \text{mol}^{-1}$$

$$\text{Absolute uncertainty} = 0.0199349800 \times 8.475283024 = 0.1689545976 \text{ J} \cdot \text{K}^{-1} \cdot \text{mol}^{-1}$$

$$R = 8.5 \pm 0.2 \text{ J} \cdot \text{K}^{-1} \cdot \text{mol}^{-1}$$

Taking into consideration the vapour pressure of water:

Not all the pressure inside the burette was a consequence of H_2 , because there was probably some water vapour. Water vapour pressure at 20°C (similar temperature as in the experiment) is around 2.3 kPa. Taking this into consideration, the pressure of H_2 was a little bit lower than the room pressure, which leads to smaller value of R constant.

$$R = \frac{(p - 2.3 \text{ kPa})VM(\text{Mg})}{Tm(\text{Mg})}$$

$$R = \frac{(97.2 - 2.3) \times 0.0498 \times 24.305}{294.3 \times 0.0472} = 8.269112869 \text{ J} \cdot \text{K}^{-1} \cdot \text{mol}^{-1}$$

$$\text{Absolute uncertainty} = 0.0199349800 \times 8.269112869 = 0.1648445997 \text{ J} \cdot \text{K}^{-1} \cdot \text{mol}^{-1}$$

$$R = 8.3 \pm 0.2 \text{ J} \cdot \text{K}^{-1} \cdot \text{mol}^{-1}$$

When taking into consideration the vapour pressure of water the final result was more accurate.

CONCLUSION AND EVALUATION:

The final result was quite accurate and precise, specially after taking into consideration the vapour pressure of water. Experimentally obtained gas constant was $8.3 \pm 0.2 \text{ J} \cdot \text{K}^{-1} \cdot \text{mol}^{-1}$, while the actual value of R is $8.31 \text{ J} \cdot \text{K}^{-1} \cdot \text{mol}^{-1}$. The actual value is within the range of the experimental values including uncertainties.