Answer on Question #71675, Chemistry / General Chemistry :

Can there be an uncertainty for moles of Hydrogen when converting from grams of magnesium?

What is the percent uncertainty of hydrogen if the uncertainty for the grams of magnesium is +/- 0.001g .
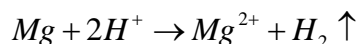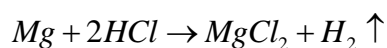
Solution.

$m(Mg) = 1.0g$

$M(Mg) = 24g/mol$

$M(H_2) = 2g/mol$

$w = \pm 0.001g$

$\Delta v(H_2) - ?$

$w(H_2) - ?$

Reaction equation converting hydrogen from magnesium:

$Mg + 2HCl \rightarrow MgCl_2 + H_2 \uparrow$

$Mg + 2H^+ \rightarrow Mg^{2+} + H_2 \uparrow$

And:

$$v(Mg) = \frac{m(Mg)}{M(Mg)} = \frac{1.0g}{24g/mol} = 0.04167 mol$$

Amount of substance hydrogen:

$$v(H_2) = v(Mg) = 0.04167 mol$$

Uncertainty for moles of Hydrogen:

$$v(H_2) = v(Mg) = \frac{m(Mg)}{M(Mg)} = \frac{0,001g}{24g/mol} = 4,167 \cdot 10^{-5} mol$$

Than:

$$v(H_2) = (0.04167 \pm 0,00004) mol$$

Percent uncertainty of hydrogen:

$$w(H_2) = \frac{0,00004}{0.04167} \cdot 100\%$$

$$w(H_2) = 0.1\%$$

Answer: $v(H_2) = (0.04167 \pm 0,00004) mol$, $w(H_2) = 0.1\%$.