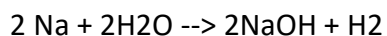


Question #84463, Chemistry / General Chemistry

How many molecules of hydrogen gas are formed when 24.6 g of sodium are added to water. Show your work.



Solution

According to the reaction equation 1 mole of hydrogen releases when 2 moles of sodium react with 2 moles of water. Find the amount of sodium given in the task:

$$v(\text{Na}) = \frac{m}{M} = \frac{24.6}{23} = 1.07 \text{ (mol)}$$

Thus the amount of hydrogen is:

$$v(\text{H}_2) = \frac{1.07}{2} = 0.535 \text{ (mol)}$$

According to Avogadro Law 1 mole of any gas contains 6.022×10^{23} particles, so find the number of particles in the given amount of hydrogen:

$$N = 0.535 \times 6.022 \times 10^{23} = \mathbf{3.22 \times 10^{23} \text{ (m.)}}$$

Answer

3.22×10^{23} molecules of hydrogen gas are formed when 24.6 g of sodium are added to water.