Limiting Reactants

New Regents original practice • Name: _____ Date: _____
Show your work for written answers.

For each mixture, compare the actual reactant amounts with the balanced mole ratio. The limiting reactant is used up first in the model.

1 In $2H_2 + O_2 \rightarrow 2H_2O$, a mixture has 2.00 mol H_2 and 2.00 mol O_2. Which reactant is limiting?

(1) H_2

(2) O_2

(3) Both are present in the required ratio.

(4) The product is limiting.

2 For $2H_2 + O_2 \rightarrow 2H_2O$, 4.00 mol H_2 reacts with 3.00 mol O_2. Calculate the moles of O_2 left after the limiting reactant is used up. [1]

Answer and work

3 Explain why the reactant with fewer moles is not automatically the limiting reactant. [1]

Answer and work

4 Which starting amounts match the exact ratio for $N_2 + 3H_2 \rightarrow 2NH_3$?

(1) 1 mol N_2 and 1 mol H_2

(2) 1 mol N_2 and 3 mol H_2

(3) 3 mol N_2 and 1 mol H_2

(4) 3 mol N_2 and 2 mol H_2

Comparing Starting Mixtures

Use the information below to answer the questions.

A simulation models complete reaction by $4Al + 3O_2 \rightarrow 2Al_2O_3$. The table lists the initial amounts of both reactants.

Mixture	**Al (mol)**	**O_2 (mol)**
P	8.0	9.0
Q	8.0	3.0
R	12.0	9.0

5 Which reactant is limiting in mixture Q?

(1) Al

(2) O_2

(3) Both amounts match the exact ratio.

(4) Al_2O_3

6 Calculate how much Al_2O_3 forms from mixture Q. Use the limiting reactant and its balanced ratio. [1]

Answer and work

7 How much O_2 remains after mixture P reacts?

(1) 0.0 mol

(2) 2.0 mol

(3) 3.0 mol

(4) 6.0 mol

8 Use the balanced ratio to explain whether mixture R leaves any reactant in excess. [1]

Answer and work