

Lecture 12 CH101 A1 (MWF 9:05 am) Fall 2018 Copyright © 2018 Dan Dill dan@bu.edu

[TP] Substances A and B combine to form substance C in the balanced chemical equation

$$3 A + 2 B \rightarrow 4 C$$

If 12 mol A and 6 mol B react completely, how many moles of A remain **unreacted**?

25% 1. 0 mol A  
25% 2. 3 mol A  
25% 3. 6 mol A  
25% 4. None of the above

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Response Counter

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Lecture 12 CH101 A1 (MWF 9:05 am)  
Monday, October 1, 2018

For today ...

- Complete ch5: Limiting reagent and percent yield

Next lecture: Begin ch6: Chemical of water, chemistry in water


Representative questions: 6.1, 6.2, 6.3, 6.4, 6.9, 6.12, 6.17, 6.19, 6.22, 6.23

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### Limiting reagent

Some CH101 students are starting a sandwich making business to nourish office hour attendees.



Unfortunately, they will offer only a single option ...  
A cheese club sandwich on Wonder bread.  
With 15 slices of bread and 6 slices of cheese, ...  
How many sandwiches can they make?  
How much of each ingredient will be left over?  
Let's see...

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### Limiting reagent

$3 \text{ Bread} + 2 \text{ Cheese} \rightarrow 1 \text{ Sandwich}$

Balanced chemical **equation** is the "recipe"

**Amounts** of reactants is **how much** can be made

**Limiting** is which reactant **makes the least**

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### Limiting reagent



3 Bread + 2 Cheese → 1 Sandwich

The limiting reagent is the one that form the **least product**.

With 15 slices of bread and 6 slices of cheese, ...

How many sandwiches can they make?

How much of each ingredient will be left over?

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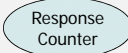

If 12 mol A and 6 mol B react completely, how many moles of C are **formed**?

25% 1. 16 mol C

25% 2. 12 mol C

25% 3. 6 mol C

25% 4. None of the above

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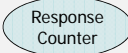

If 12 mol A and 6 mol B react completely, how many moles of A remain **unreacted**?

25% 1. 0 mol A

25% 2. 3 mol A

25% 3. 6 mol A

25% 4. None of the above

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### Reaction yield



Balanced chemical **equation** is the “**recipe**”

$$2 A + B \rightarrow 2 C$$

8 mol A and 5 mol B react to form 6 mol C.

What is the limiting reagent?

What is the percent yield?

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## Reaction yield

Ethane,  $C_2H_6$ , burns in air to form  $CO_2$  and water. When 5.00 mol of ethane and 11.0 mol of  $O_2$  react in this way 4.00 mol of water are formed.

What is the % yield?

Answer: 42.4%



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## Reaction yield

Ethane,  $C_2H_6$ , burns in air to form  $CO_2$  and water. When 5.00 mol of ethane and 11.0 mol of  $O_2$  react in this way 4.00 mol of water are formed.

How much of each reactant remains?

Answer: 3.67 mol ethane and 6.34 mol  $O_2$

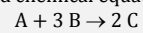


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[Quiz] Substances A and B combine to form substance C in the balanced chemical equation



8 mol A and 5 mol B react to form 2 mol C. The % yield is ...

- 20% 1. 100%
- 20% 2. 75%
- 20% 3. 60%
- 20% 4. 40%
- 20% 5. None of these

Response  
Counter

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