

# Warm-Up #39

Name: \_\_\_\_\_ Date: \_\_\_\_\_

Aluminum reacts with  $\text{Cu}(\text{NO}_3)_2$  to produce copper and  $\text{Al}(\text{NO}_3)_3$  according to the balanced equation below. 8.0 moles of Al and 9.0 moles of  $\text{Cu}(\text{NO}_3)_2$  are placed into a reaction vessel and allowed to react.

1. Complete a Before-Change-After (BCA) table for the reaction.



	B	8	9	0	0
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	C	<del>-8</del>	<del><math>-8\left(\frac{3}{2}\right) = -12</math></del>		
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Not enough  $\text{Cu}(\text{NO}_3)_2$ !  
 Start a new change row,  
 using 9 mol  $\text{Cu}(\text{NO}_3)_2$  as  
 the given

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	C	$-9\left(\frac{2}{3}\right)$ =-6	-9	$+9\left(\frac{3}{3}\right)$ =+9	$+9\left(\frac{3}{3}\right)$ =+9
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	A	2 moles	0 moles	9 moles	9 moles
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2. How many grams of copper are produced?

BCA is for moles only; Must convert 9 moles Cu to grams Cu

$$\frac{9 \text{ mol Cu} \mid 63.55 \text{ g Cu}}{1 \text{ mol Cu}} = 571.95 = \boxed{570 \text{ g Cu}} \quad \underline{\underline{2 \text{ sig Figs}}}$$

3. What is the limiting reactant?

$\text{Cu}(\text{NO}_3)_2$  (zero moles at end of rxn)

4. What is the excess reactant?

Al (extra moles left over that did not react)

5. How many grams of excess reactant remain after the reaction?

2 moles of Al remain

$$\frac{2 \text{ mol Al} \mid 26.98 \text{ g Al}}{1 \text{ mol Al}} = 53.96 = \boxed{54 \text{ g Al}} \quad \underline{\underline{2 \text{ sig Figs}}}$$