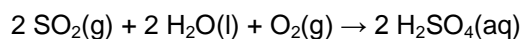
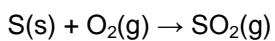




3. A rocket fuel is prepared by reacting hydrazine and dinitrogen tetroxide according to the equation  
 $2 \text{N}_2\text{H}_4(\text{l}) + \text{N}_2\text{O}_4(\text{l}) \rightarrow 3 \text{N}_2(\text{g}) + 4 \text{H}_2\text{O}(\text{g}) + 2400 \text{ kJ}$   
Calculate the energy released (in kJ) when 3200 grams of hydrazine are consumed in the rocket engine.

4. Acid rain containing  $\text{H}_2\text{SO}_4$  is a product of sulfur combustion in gasoline according to the two reactions shown below. If a sample of gasoline is found to contain 75.0 g of S, how many moles of  $\text{H}_2\text{SO}_4$  can be formed in rain?



**Answers**

1. Theoretical yield  
0.273 g, .106  
grams of excess  
reagent remain
2. 37.4% yield, note  
that it is a LR  
problem!
3.  $-1.2 \times 10^5 \text{ kJ}$
4. 2.34 moles