

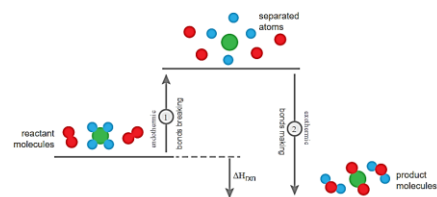
Calculate the energy released when 135g of aluminum are reacted in the below equation.
 $2\text{Al} + \text{Fe}_2\text{O}_3 \rightarrow 2\text{Fe} + \text{Al}_2\text{O}_3 \quad \Delta H_{\text{rxn}} = -851.5\text{kJ}$

Calculate ΔH for combustion of methane, CH_4
 $\text{CH}_4(\text{g}) + 2\text{O}_2(\text{g}) \rightarrow \text{CO}_2(\text{g}) + 2\text{H}_2\text{O}(\text{l})$

Substance	ΔH_f (kJ)
CH_4	-74.80
O_2	0
CO_2	-393.50
H_2O	-285.83

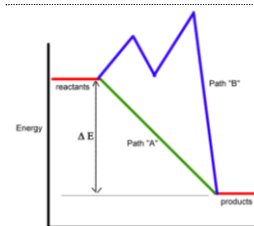
What is $\Delta H_{\text{rxn}}^\circ$ (kJ) for combustion of ethanol?
 $2\text{C}_2\text{H}_5\text{OH}(\text{l}) + 6\text{O}_2(\text{g}) \rightarrow 4\text{CO}_2(\text{g}) + 6\text{H}_2\text{O}(\text{l})$

Formula	ΔH_f°
$\text{C}_2\text{H}_5\text{OH}(\text{l})$	-277.6
$\text{CO}_2(\text{g})$	-393.5
$\text{H}_2\text{O}(\text{g})$	-241.8
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Action	Algebraic Sign	How to Remember
Break a Bond	+	Takes to Break
Form a Bond	-	Free to Form

Single Bond Energies (kJ/mol of bonds)										
H	C	N	O	S	F	Cl	Br	I		
H 436	C 413	N 346	O 498	S 265	F 485	Cl 339	Br 276	I 238		
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Calculate ΔH for combustion of CH_4 :
 $\text{CH}_4 + 2\text{O}_2 \rightarrow \text{CO}_2 + 2\text{H}_2\text{O}$

#	Reaction	ΔH°
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2	$\text{C} + \text{O}_2 \rightarrow \text{CO}_2$	-393.50 kJ
3	$\text{H}_2 + \frac{1}{2}\text{O}_2 \rightarrow \text{H}_2\text{O}$	-285.83 kJ

$2\text{NOCl}(\text{g}) \rightarrow \text{N}_2(\text{g}) + \text{O}_2(\text{g}) + \text{Cl}_2(\text{g}) \quad \Delta H = ?$

Rxn #1	$\frac{1}{2}\text{N}_2(\text{g}) + \frac{1}{2}\text{O}_2(\text{g}) \rightarrow \text{NO}(\text{g})$ $\Delta H = 90.3\text{ kJ}$
Rxn #2	$\text{NO}(\text{g}) + \frac{1}{2}\text{Cl}_2(\text{g}) \rightarrow \text{NOCl}(\text{g})$ $\Delta H = -38.6\text{ kJ}$

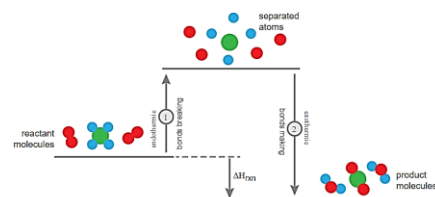
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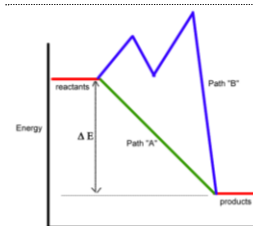
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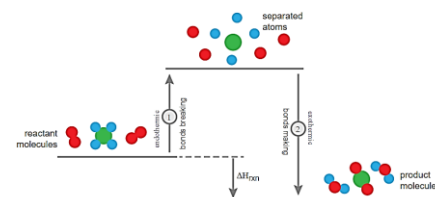
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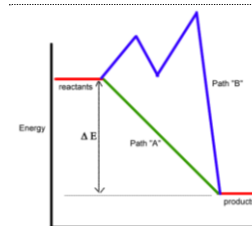
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