

Homework: Calculating the Enthalpy of Reaction

Calculate the **enthalpy of reaction (ΔH)** and state whether each reaction is **exothermic (exo)** or **endothermic (endo)**. Use the exo or endo to answer. Use the table on the back to find the enthalpy of formations for each substance. Use your own

- $\text{SO}_3(\text{g}) + \text{H}_2\text{O}(\text{g}) \rightarrow \text{H}_2\text{SO}_4(\text{aq})$
- $\text{N}_2(\text{g}) + 3\text{H}_2(\text{g}) \rightarrow 2\text{NH}_3(\text{g})$
- $2\text{NH}_3(\text{g}) + 4\text{H}_2\text{O}(\text{l}) \rightarrow 2\text{NO}_2(\text{g}) + 7\text{H}_2(\text{g})$
- $\text{H}_2\text{O}_2(\text{l}) \rightarrow \text{H}_2\text{O}(\text{l}) + \text{O}_2(\text{g})$
- $\text{CS}_2(\text{l}) + 3\text{O}_2(\text{g}) \rightarrow \text{CO}_2(\text{g}) + 2\text{SO}_2(\text{g})$
- Does the graph shown depict an endothermic or an exothermic reaction?

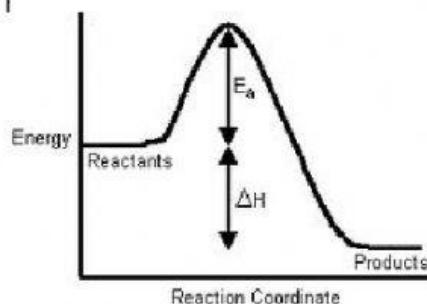


Table C-13

Heat of Formation Values					
ΔH_f° (kJ/mol) (concentration of aqueous solutions is 1M)					
Substance	ΔH_f°	Substance	ΔH_f°	Substance	ΔH_f°
Ag(s)	0	CsCl(s)	-443.04	$\text{H}_3\text{PO}_4(\text{aq})$	-1279.0
AgCl(s)	-127.068	$\text{Cs}_2\text{SO}_4(\text{s})$	-1443.02	$\text{H}_2\text{S}(\text{g})$	-20.63
AgCN(s)	146.0	CuI(s)	-67.8	$\text{H}_2\text{SO}_3(\text{aq})$	-608.81
Al_2O_3	-1675.7	CuS(s)	-53.1	$\text{H}_2\text{SO}_4(\text{aq})$	-814.0
$\text{BaCl}_2(\text{aq})$	-871.95	$\text{Cu}_2\text{S}(\text{s})$	-79.5	$\text{HgCl}_2(\text{s})$	-224.3
BaSO_4	-1473.2	$\text{CuSO}_4(\text{s})$	-771.36	$\text{Hg}_2\text{Cl}_2(\text{s})$	-265.22
BeO(s)	-609.6	$\text{F}_2(\text{g})$	0	$\text{Hg}_2\text{SO}_4(\text{s})$	-743.12
$\text{BiCl}_3(\text{s})$	-379.1	$\text{FeCl}_3(\text{s})$	-399.49	$\text{I}_2(\text{s})$	0
$\text{Bi}_2\text{S}_3(\text{s})$	-143.1	FeO(s)	-272.0	K(s)	0
Br_2	0	FeS(s)	-100.0	KBr(s)	-393.798
$\text{CCl}_4(\text{l})$	-128.2	$\text{Fe}_2\text{O}_3(\text{s})$	-824.2	$\text{KMnO}_4(\text{s})$	-837.2
$\text{CH}_4(\text{g})$	-74.81	$\text{Fe}_3\text{O}_4(\text{s})$	-1118.4	KOH	-424.764
$\text{C}_2\text{H}_2(\text{g})$	226.73	H(g)	217.965	LiBr(s)	-351.213
$\text{C}_2\text{H}_4(\text{g})$	52.26	$\text{H}_2(\text{g})$	0	LiOH(s)	-484.93
$\text{C}_2\text{H}_6(\text{g})$	-84.68	HBr(g)	-36.40	Mn(s)	0
CO(g)	-110.525	HCl(g)	-92.307	$\text{MnCl}_2(\text{aq})$	-555.05
$\text{CO}_2(\text{g})$	-393.509	HCl(aq)	-167.159	$\text{Mn}(\text{NO}_3)_2(\text{aq})$	-635.5
$\text{CS}_2(\text{l})$	89.70	HCN(aq)	108.9	$\text{MnO}_2(\text{s})$	-520.03
Ca(s)	0	HCHO	-108.57	MnS(s)	-214.2
$\text{CaCO}_3(\text{s})$	-1206.9	HCOOH(l)	-424.72	$\text{N}_2(\text{g})$	0
CaO(s)	-635.1	HF(g)	-271.1	$\text{NH}_3(\text{g})$	-46.11
$\text{Ca}(\text{OH})_2(\text{s})$	-986.09	HI(g)	26.48	$\text{NH}_4\text{Br}(\text{s})$	-270.83
$\text{Cl}_2(\text{g})$	0	$\text{H}_2\text{O}(\text{l})$	-285.830	NO(g)	90.25
$\text{Co}_3\text{O}_4(\text{s})$	-891	$\text{H}_2\text{O}(\text{g})$	-241.818	$\text{NO}_2(\text{g})$	33.18
CoO(s)	-237.94	$\text{H}_2\text{O}_2(\text{l})$	-187.8	$\text{N}_2\text{O}(\text{g})$	82.05
$\text{Cr}_2\text{O}_3(\text{s})$	-1139.7	$\text{H}_3\text{PO}_4(\text{l})$	-595.4	Na(s)	0
				$\text{NaBr}(\text{s})$	-361.062
				NaCl(s)	-411.153
				$\text{NaHCO}_3(\text{s})$	-950.8
				$\text{NaNO}_3(\text{aq})$	-447.48
				NaOH(s)	-425.609
				$\text{Na}_2\text{CO}_3(\text{s})$	-1130.7
				$\text{Na}_2\text{S}(\text{aq})$	-447.3
				$\text{Na}_2\text{SO}_4(\text{s})$	-1387.08
				$\text{NH}_4\text{Cl}(\text{s})$	-314.4
				$\text{O}_2(\text{g})$	0
				$\text{P}_4\text{O}_6(\text{s})$	-1640.1
				$\text{P}_4\text{O}_{10}(\text{s})$	-2984.0
				$\text{PbBr}_2(\text{s})$	-278.7
				$\text{PbCl}_2(\text{s})$	-359.41
				$\text{SF}_6(\text{g})$	-1220.5
				$\text{SO}_2(\text{g})$	-296.830
				$\text{SO}_3(\text{g})$	-454.51
				SrO(s)	-592.0
				$\text{TiO}_3(\text{s})$	-939.7
				TiI(s)	-123.5
				$\text{UCl}_4(\text{s})$	-1019.2
				$\text{UCl}_5(\text{s})$	-1059
				Zn(s)	0
				$\text{ZnCl}_2(\text{aq})$	-488.19
				$\text{ZnO}(\text{s})$	-348.28
				$\text{ZnSO}_4(\text{aq})$	-1063.15