Hess's Law

Reaction	) H (kJ)	Reaction	) H (kJ)
$H_{2(g)} + ½O_{2(g)} \rightarrow H_2O_{(l)}$	–285.8	$½N_{2(g)} + O_{2(g)} \rightarrow NO_{2(g)}$	33.1
$H_2O_{(l)} \rightarrow H_2O_{(g)}$	40.7	$N_{2(g)} + 2O_{2(g)} \rightarrow N_2O_{4(g)}$	9.1
$H_2O_{(s)} \rightarrow H_2O_{(l)}$	6.00	$Sn_{(s)} + Cl_{2(g)} \rightarrow SnCl_{2(l)}$	–325.1
$C_{(graphite)} + O_{2(g)} \rightarrow CO_{2(g)}$	–393.5	$SnCl_{2(s)} + Cl_{2(g)} \rightarrow SnCl_{4(l)}$	–186.2
$SiO_{2(s)} + 2C_{(s)} \rightarrow {}_{impure}Si_{(s)} + 2CO_{(g)}$	689.9	$S_{(s)} + {}^3/_2O_{2(g)} \rightarrow SO_{3(g)}$	–395.7
${}_{impure}Si_{(s)} + 2Cl_{2(g)} \rightarrow {}_{pure}SiCl_{4(g)}$	–657.0	$Mg_{(s)} + ½O_{2(g)} \rightarrow MgO_{(s)}$	–601.7
${}_{pure}SiCl_{4(g)} + 2Mg_{(s)} \rightarrow 2MgCl_{2(s)} + {}_{pure}Si_{(s)}$	–625.6	$Mg_{(s)} + S_{(s)} \rightarrow MgS_{(s)}$	–598.0
$C_{(s)} + O_{2(g)} \rightarrow CO_{2(g)}$	–393.5	$S_{(s)} + O_{2(g)} \rightarrow SO_{2(g)}$	–296.8
$C_2H_{2(g)} + {}^5/_2O_{2(g)} \rightarrow 2CO_{2(g)} + H_2O_{(l)}$	–1,299.5		

For each of the following problems write the net reaction and calculate) H.

1. Changing 1.00 mole of silica, SiO_2, that has been extracted from sand into the pure silicon that is needed to make computer chips.

2. How much energy is required to turn 10 moles of steam into elemental hydrogen and oxygen?

3. Dinitrogen tetraoxide is synthesized from nitrogen dioxide (only)?

4. Tin (IV) chloride liquid is made from solid tin and chlorine gas? [Note you have to skip $SnCl_{2(l)} \rightarrow SnCl_{2(s)}$]

5. How much heat is released when 100g of steam is frozen into ice?

6. Magnesium metal is combined with sulfur dioxide gas to make magnesium sulfide and magnesium oxide.

7. In automobile catalytic converters, SO_2 is converted into SO_3 and facilitates the reduction of both NO and NO_2 to N_2. Calculate) H for combining sulfur dioxide with oxygen gas to make sulfur trioxide.

8. Solid carbon is combined with hydrogen gas to form dicarbon dihydride.