

Lecture Notes D: Demo on Combustion Processes

In this demo, we will consider the combustion of the following gases: hydrogen (H_2), methane (CH_4), and propane (C_3H_8). The amount of heat released by the combustion can be calculated as follows.

Concept

Assume the balloons all have the same size (volume). Which contains the most molecules:

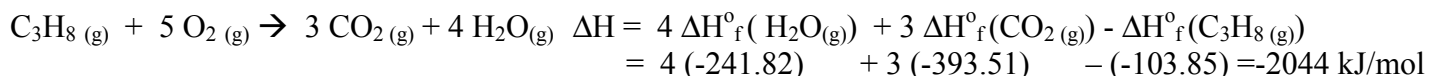
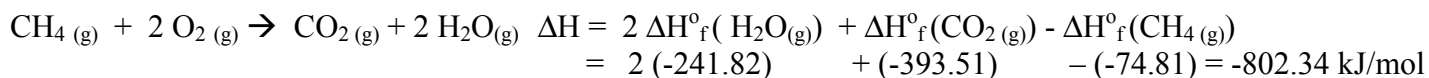
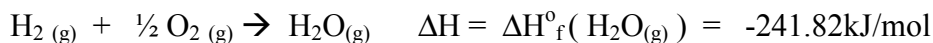
- (a) hydrogen (H_2) (b) methane (CH_4) (c) propane (C_3H_8) (d) they contain the same # molecules

Which weighs more, a liter of dry air or a liter of wet air?

- (a) wet air (b) dry air (c) they weigh the same

	MW (amu)	ΔH°_f (kJ/mol)
hydrogen (H_2)	2.016	0
methane (CH_4)	16.043	-74.81
propane (C_3H_8)	44.096	-103.85
$\text{H}_2\text{O}(\text{g})$	18.01	-241.82
$\text{CO}_2(\text{g})$	44.01	-393.51 kJ/mol

Consider ΔH for the combustion reactions,



Concept

Which balloon will give off the most heat when exploded

- (a) hydrogen (H_2) (b) methane (CH_4) (c) propane (C_3H_8)