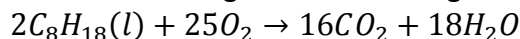


Answer on Question #83255 – Chemistry – General Chemistry

Question

Carbon dioxide in the atmosphere has been a topic in the news lately as one of the major causes of global warming and climate change (a topic we will explore later). One of the major components of gasoline is octane and it undergoes the following reaction in your car:



If the typical tank (about 15gal) can hold 42.6kg of gasoline, how many kg of CO_2 will be released into the air from using your car?

Solution

42.6kg is 42600g. From equation of the reaction it follows, that from two moles of C_8H_{18} sixteen moles of CO_2 are produced. Molar mass of C_8H_{18} equals $12 \times 8 + 1 \times 18 = 114 \left(\frac{g}{mol}\right)$. Molar mass of CO_2 equals $12 + 16 \times 2 = 44 \left(\frac{g}{mol}\right)$. Two moles of C_8H_{18} weigh $114 \frac{g}{mol} \times 2mol = 228g$, sixteen moles of CO_2 weigh $44 \frac{g}{mol} \times 16mol = 704g$. Therefore, there is a proportion:

228g of gasoline produce 704g of carbon dioxide;
42600g of gasoline produce Xg of carbon dioxide.

$$\frac{228}{42600} = \frac{704}{X}$$

$$X = \frac{42600 \times 704}{228} \approx 131537$$

Thus, 42600g of gasoline produce 131537g, or 131.537kg of carbon dioxide.

Answer: it will be released 131.537kg of carbon dioxide.