Answer on question #70414, Chemistry / General Chemistry

If the density of ethanol, C2H5OH, is 0.789 g/mL. How many milliliters of ethanol are needed to produce 15.0 g of CO2 according to the following chemical equation?
C2H5OH(l) + 3 O2(g) → 2 CO2(g) + 3 H2O(l)

Solution:

$$n(CO_2) = \frac{m}{M} = \frac{15g}{44\,{}^{g}/_{mol}} = 0.341\,mol;$$

$$n(C_2H_2OH) = \frac{n(CO_2)}{2} = \frac{0.341}{2} = 0.1705\,mol;$$

$$m(C_2H_2OH) = 0.1705\,mol \cdot 46\,{}^{g}/_{mol} = 7.843\,g;$$

$$V(C_2H_2OH) = \frac{7.843}{0.789} = 9.94\,ml.$$

Answer: **9.94 ml.**