Answer on the question #43062, Chemistry, Physical Chemistry
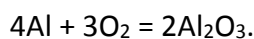
Question:

4Al + 3O2 ---> 2 Al2O3
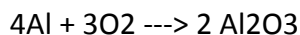
If 0.54 mole of Al reacts with 0.54 mole of O2, as above, how many moles of Al2O3 could form?

a) 0.27 mole
b) 0.36 mole
c) 0.81 mole
d) 1.08 mole

Solution:

The equation of the reaction is:

$4Al + 3O_2 = 2Al_2O_3$.

Then, the relation between the amounts of Aluminum, Oxygen and aluminum oxide is:

$$\frac{n(Al)}{4} = \frac{n(O_2)}{3} = \frac{n(Al_2O_3)}{2}$$

As we can see, that there is an excess of O_2. Thus, the amount of Al_2O_3 is:

$$n(Al_2O_3) = 2\frac{n(Al)}{4} = \frac{0.54}{2} = 0.27 \text{ mol}$$

Answer: (a) 0.27 mol