

How many mole of oxygen should be combined with 12 grams of nitrogen to produce equivalent quantity of ammonium sulfate?

Solution: Chemical formula of ammonium sulfate is $(\text{NH}_4)_2\text{SO}_4$. 1 mole of this salt contains 1 mole of nitrogen N_2 and 2 moles of oxygen O_2 . If it contains 12 grams of nitrogen, then the substance amount of nitrogen is: $n(\text{N}_2) = m(\text{N}_2)/M(\text{N}_2) = 12/28 = 0.429$ mole, $M(\text{N}_2) = 28$ g/mol – molar mass of nitrogen;

According to the law of constant proportion, $n(\text{O}_2) = 2 \cdot n(\text{N}_2) = 2 \cdot 0.429 = 0.858$ mole

Answer: 0.858 mole.