Fireworks: the art and science – answers

Education in Chemistry
September 2019
rsc.li/2ZuipHX

How fireworks work

1. Potassium nitrate + sulfur + carbon → potassium sulfide + nitrogen + carbon dioxide

2. KNO_3, K_2S

3. $2KNO_3 + S + 3C \rightarrow K_2S + 3CO_2 + N_2$

4. Potassium nitrate → potassium nitrite + oxygen

   $2KNO_3 \rightarrow 2KNO_2 + O_2$

5. Thermal: requires heat
   Decomposition: chemical breaks down (decomposes)

6. Moles = 10.0 / 101 = 0.099
   Ratio = 2:1 = moles O_2 = 0.0594
   Mass O_2 = 0.0594 x 32 = 1.90 g

7. 0.0594 x 24 = 1.4 dm^3

Flame colours

1. a. crimson
   b. yellow
   c. lilac
   d. orange–red
   e. green

2. The manufacturers mix different metals together to get different colours and hues.