Answer on question #62247, Chemistry / General Chemistry

For each reaction, calculate the mass of the product that forms when 14.4 g of the reactant in red completely reacts. Assume that there is more than enough of the other reactant.

$2K(s)+Cl_2(g)\rightarrow 2KCl(s)$
Express your answer in grams to three significant figures.

$2K(s)+Br_2(l)\rightarrow 2KBr(s)$
Express your answer in grams to three significant figures.

$4Cr(s)+3O_2(g)\rightarrow 2Cr_2O_3(s)$
Express your answer in grams to three significant figures.

$2Sr(s)+O_2(g)\rightarrow 2SrO(s)$
Express your answer in grams to three significant figures.

Solution:

$2K(s)+Cl_2(g)\rightarrow 2KCl(s)$
moles Cl_2 = 14.4 g / 70.906 g/mol=0.203 mol
moles KCl produced =2 x 0.203 mol=0.406 mol
mass KCl = 0.406 mol x 78.196 g/mol=31.7 g

Answer: 31.7 g

$2K(s)+Br_2(l)\rightarrow 2KBr(s)$
moles Br_2 = 14.4 g / 159.808 g/mol= 0.0901
moles KBr = 2 x 0.0901 =0.180
mass KBr = 0.180 mol x 119.0 g/mol=21.4 g

Answer: 21.4 g

$4Cr(s)+3O_2(g)\rightarrow 2Cr_2O_3(s)$
moles O_2 = 14.4 g / 32 g/mol=0.450
moles Cr_2O_3 = 0.450 x 2/3=0.300
mass Cr_2O_3 = 0.300 mol x 151.99 g/mol=45.6 g
Answer: 45.6 g

$2Sr(s)+O_2(g)\rightarrow 2SrO(s)$
moles Sr = 14.4 g / 175.24 g/mol= 0.0822
moles SrO = 2 x 0.0822=0.1644
mass SrO = 0.1644 mol x 103.62 g/mol=17.0 g

Answer: 17.0 g