Answer on Question #70698 - Chemistry - General Chemistry
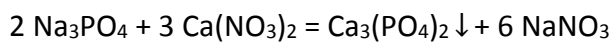
Question: If 10 drops of 0.5 mol L^{-1} Na$_3$PO$_{4(aq)}$ had been added to the sample containing excess 0.25 mol L^{-1} Ca(NO$_3$)$_{2(aq)}$, what mass of precipitate would you expect to produce? You may assume one drop is equal to a volume of 0.05 mL

Solution:

2 Na$_3$PO$_4$ + 3 Ca(NO$_3$)$_2$ = Ca$_3$(PO$_4$)$_2$↓ + 6 NaNO$_3$

m(Ca$_3$(PO$_4$)$_2$) = n(Ca$_3$(PO$_4$)$_2$)·M(Ca$_3$(PO$_4$)$_2$) = n(Na$_3$PO$_4$)/2·M(Ca$_3$(PO$_4$)$_2$) = c(Na$_3$PO$_4$) · V(solution)/2 ·M(Ca$_3$(PO$_4$)$_2$) = c(Na$_3$PO$_4$)·N·V(drop)/2·M(Ca$_3$(PO$_4$)$_2$) = 0.5·10·0.05·10^{-3}/2·310 = 0.03875 (g) = 38.75 (mg)

Answer: I would expect to produce 38.75 mg of precipitate Ca$_3$(PO$_4$)$_2$