3. A 0.150 g sample of solid lead(II) nitrate is added to 125 mL of 0.100 *M* sodium iodide solution. Assume no change in volume of the solution. The chemical reaction that takes place is represented by the following equation.

$$Pb(NO_3)_2(s) + 2\ NaI(aq) \rightarrow PbI_2(s) + 2\ NaNO_3(aq)$$

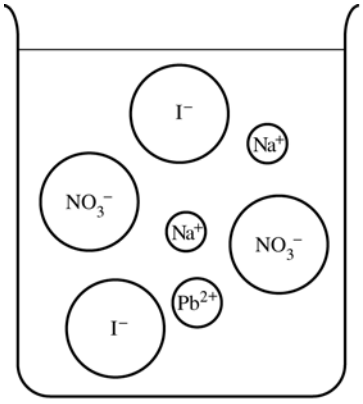
(a) List an appropriate observation that provides evidence of a chemical reaction between the two compounds.

(b) Calculate the number of moles of each reactant.

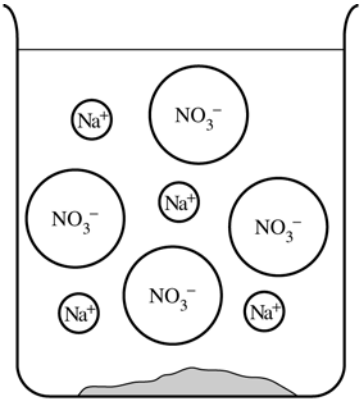
(c) Identify the limiting reactant. Show calculations to support your identification.

(d) Calculate the molar concentration of $NO_3^-(aq)$ in the mixture after the reaction is complete.

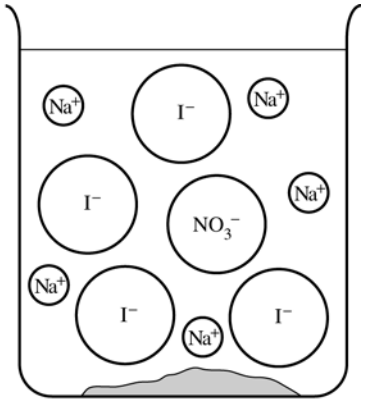
(e) Circle the diagram below that best represents the results after the mixture reacts as completely as possible. Explain the reasoning used in making your choice.



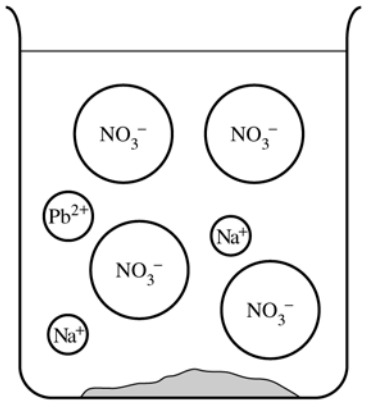
No Precipitate



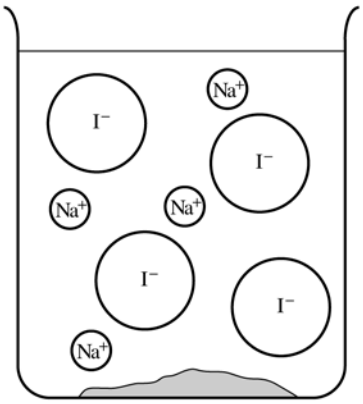
Solid PbI_2



Solid PbI_2



Solid PbI_2



Solid $Pb(NO_3)_2$