

## Answer on Question #56432 – Chemistry - Other

### Question:

The  $K_{sp}$  of magnesium fluoride is  $3.7 \times 10^{-8}$ . When 400.0 ml of 0.600 M NaF is mixed with 600 ml of 0.217 M  $Mg(NO_3)_2$ , a precipitate forms.

(a) what mass of magnesium fluoride ( $M=62.30$  g/mol) is produced?

(b) what will be the equilibrium concentrations of  $Mg^{2+}$  and  $F^-$  in the resulting solution?

### Answer:



According to the reaction,  $v(MgF_2) = v(Mg(NO_3)_2)$

$$v = \frac{m}{M} = C_M V$$

$$m(NaF) = C_M(Mg(NO_3)_2) \cdot V(Mg(NO_3)_2) \cdot M(MgF_2)$$

$$m(NaF) = 0.600 \cdot 0.217 \cdot 62.30 = 8.11 \text{ g}$$

b)  $K_{sp} = [Mg^{2+}][F^-]^2$

$$3.7 \times 10^{-8} = [Mg^{2+}][F^-]^2$$

$$[Mg^{2+}] = (3.7 \times 10^{-8})^{1/3} = 0.003 \text{ M}$$

$$[F^-] = 0.003^2 = 0.00001 \text{ M}$$