

Answer on Question #39456, Chemistry, Physical Chemistry

Question

A mixture of ZnCl_2 and CdCl_2 weighs 1.000 g. Treatment with $\text{AgNO}_3(\text{aq})$ converts all of the chloride into 1.902 g of AgCl . What is the percent by mass of ZnCl_2 in the original mixture? (Choose the closest value.)

- A 15.0%
- B 50.0%
- C 53.9%
- D 62.6%
- E 84.1%

Answer

$\text{MeCl}_2 \rightarrow 2\text{AgCl}$

$$m(\text{AgCl from ZnCl}_2) = 2 \cdot M(\text{AgCl}) / M(\text{ZnCl}_2) \cdot m(\text{ZnCl}_2) = 2 \cdot 143.5 / 136 \cdot m(\text{ZnCl}_2) = 2.11 \cdot m(\text{ZnCl}_2)$$
$$m(\text{AgCl from CdCl}_2) = 2 \cdot M(\text{AgCl}) / M(\text{CdCl}_2) \cdot m(\text{CdCl}_2) = 2 \cdot 143.5 / 183 \cdot m(\text{CdCl}_2) = 1.57 \cdot m(\text{CdCl}_2)$$

Now, we have the system:

$$2.11 \cdot m(\text{ZnCl}_2) + 1.57 \cdot m(\text{CdCl}_2) = 1.902$$
$$m(\text{ZnCl}_2) + m(\text{CdCl}_2) = 1.000$$

solution gives: $m(\text{ZnCl}_2) = 0.615 \text{ g}$, $m(\text{CdCl}_2) = 0.385 \text{ g}$.
Hence, the closest value for ZnCl_2 percent is D: 62.6 %.

Answer: D.