

### Answer on Question #45208, Chemistry, Inorganic Chemistry

#### Question

Barium chloride has the formula  $\text{BaCl}_2 \cdot x \text{H}_2\text{O}$ . On heating 4.88g of barium chloride crystals, 4.16g of anhydrous barium chloride remain. Calculate the value of x in  $\text{BaCl}_2 \cdot x \text{H}_2\text{O}$ .

#### Solution

4.16g of anhydrous barium chloride is related to:

$$n(\text{BaCl}_2) = m/M = 4.16/208,23 = 0.02 \text{ mole.}$$

$4.88\text{g} - 4.16\text{g} = 0.72\text{g}$  is the mass of  $\text{H}_2\text{O}$  in  $\text{BaCl}_2 \cdot x \text{H}_2\text{O}$ . Thus:

$$n(\text{H}_2\text{O}) = m/M = 0.72/18.015 = 0.04 \text{ mole.}$$

$n(\text{H}_2\text{O}) = 2 n(\text{BaCl}_2)$  therefore the formula is  $\text{BaCl}_2 \cdot 2\text{H}_2\text{O}$ ,  $x = 2$ .

**Answer:**  $x = 2$