Finding the Formula of a Hydrate

Finding the formula of a hydrate is an empirical formula problem.

1. Find the mass of the water and the anhydride
2. Convert mass to moles using the gram-formula masses
3. Normalize by dividing the mole ratios by the smallest number
4. Clear any fractions by multiplying by the inverse

Example: A 5.000 g sample of a $BaCl_2$ hydrate loses 0.740 g upon heating. Find the formula of the hydrate.

H_2O = 0.740 g and $BaCl_2$ = 5.000 g – 0.740 g = 4.260 g

$$H_2O: \quad 0.740\ \text{g} \times \frac{1\ \text{mol}}{18.0153\ \text{g}} = 0.0411\ \text{mol} \div 0.0205 = 2\ \text{mol}$$

$$BaCl_2: \quad 4.260\ \text{g} \times \frac{1\ \text{mol}}{208.23\ \text{g}} = 0.0205\ \text{mol} \div 0.0205 = 1\ \text{mol}$$

The formula is $BaCl_2 \bullet 2H_2O$

This is the last page.