anhydrous salt to be 208.3 g. Using Equation 2, determine the number of moles of the anhydrous salt.

Equation 2

Number of moles of anhydrous salt after heating, mol =

$$\left(\frac{\text{mass of anhydrous after heating, g}}{1}\right)\left(\frac{1\text{ mol anhydrous salt}}{\text{mass of 1 mol anhydrous salt, g}}\right)=$$

$$\left(\frac{1.060\text{ g } BaCl_2}{1}\right)\left(\frac{1\text{ mol } BaCl_2}{208.3\text{ g } BaCl_2}\right)= 5.089 \times 10^{-3}\text{ mol } BaCl_2$$

From the mass of water lost, calculate the number of moles of water present in the original sample of the hydrate, using Equation 3.

Equation 3

Number of moles of water lost =

$$\left(\frac{\text{mass of water lost, g}}{1}\right)\left(\frac{1\text{ mol water}}{18.02\text{ g}}\right)$$

$$=\left(\frac{0.190\text{ g}}{1}\right)\left(\frac{1\text{ mol water}}{18.02\text{ g}}\right)$$

$$= 1.05 \times 10^{-2}\text{ mol water}$$

Using Equation 4, determine the water of hydration by comparing the number of moles of water with the number of moles of anhydrous salt.

Equation 4

Waters of hydration =

$$\left(\frac{\text{number of moles water, mol}}{\text{number of moles anhydrous salt, mol}}\right)$$

$$=\left(\frac{1.05 \times 10^{-2}\text{ mol water}}{5.09 \times 10^{-3}\text{ mol } BaCl_2}\right)$$

$$= 2.06 \approx 2$$

Thus, the formula of the hydrate that we analyzed is $BaCl_2 \cdot 2\ H_2O$