**Hydrates** are ionic salts that have a definite amount of water molecules bonded to that ionic compound.

The formula of a hydrate is represented in a special way: ionic salt • *x* (H2O) The *x* represents a specific number of water molecules.

Table

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**IMPORTANT**

To separate a hydrate from a water molecule you have to heat it! The hydrate separates into water and into an anhydrous salt. When you heat a hydrate and start to evaporate out the water, the color changes and the mass will also change due to the loss of water.



**Anhydrous** = desiccated-it has no more water in it. It’s *just* the ionic salt

**Hydrate**= salt *with* the water molecules *still* bonded.

% water = x 100

Calculate the % composition of water in BaCl2 • 2H2O

You can also calculate the % water during a laboratory. If you have the mass of the hydrate before and then the mass of the hydrate after it has been heated, you can calculate the % composition of water.

SIMPLE VERSION

A 4.5 g sample of a hydrate Ca(NO3)2 • *x*(H2O) was heated and after it was heated, 2.8 g of the anhydrous salt remained. What percentage of water was in the hydrate?

How do you find the formula of a hydrate if you do not know the specific quantity of water molecules?

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1. A hydrate of magnesium sulfate has a mass of 13.52 g. This sample is heated until no water remains. The MgSO4 anhydrate has a mass of 6.60 g. Find the formula and name of the hydrate.
2. A sample of copper (II) sulfate hydrate has a mass of 3.97 g. After heating, the CuSO4 that remains has a mass of 2.54 g. Determine the correct formula and name of the hydrate.
3. When 5.00 g of FeCl3 · xH20 are heated, 2.00 g of H2O are driven off. Find the chemical formula and the name of the hydrate.
4. A sample of the hydrate of sodium carbonate has a mass of 8.85 g. It loses 1.28 g when heated. Find the formula and the name of the hydrate.