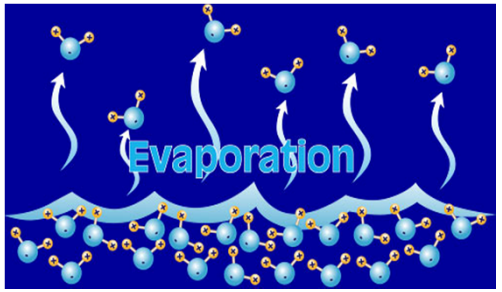
Condensation in the Oven Cavity

Cooking food from a frozen state means the water content of the produce is very high.

As the air inside the oven cavity reaches a high temperature ('superheated') and the water evaporates to a gas, the air inside the cavity becomes more absorbent , i.e. level of humidity. increases, holding the moisture in suspension in its gaseous molecular form (steam).

This continues until the air reaches saturation point, or until a cooler surface is available (such as by opening the cavity door) when the water content is returned to its liquid state as condensation.

Preheating the cavity reduces the effect, as does cooking only defrosted food.
Any water that goes into a sealed cavity will not just disappear, it will appear as water in the cavity when cooled.



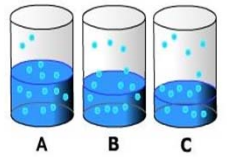


Figure 7.5 Evaporation and condensation in an enclosed beaker of water.

The saturation level of the air is directly related to the air's temperature. As air temperature increases, more water can remain in a gas phase. As temperature decreases, water molecules slow down and there is a greater chance for them to condense on to surfaces. The graph below shows the relationship between air temperature and vapor pressure, a measure of the humidity, at saturation.