

Physical Properties of Water

Each time water changes physical state, energy is involved.

Specific Heat of Water

1 gram of water requires 1 calorie of energy to be raised 1°C in temperature.

Latent Heat of Fusion

Latent heat is the energy absorbed or released when a substance changes its physical state. Water requires 80 calories of energy to shift in phase from solid to liquid at 0°C

Latent Heat of Vaporization

As 1 gram of liquid water at 100°C requires **540** calories of energy to overcome the bonds between molecules that glue water as a liquid.

Math

Doing the math, we see that it takes **720** calories per gram of water to *sublimate* ice at 0°C to vapor at 100°C:

80 calorie units ice to liquid water at 0°C,;

100 calories needed to move liquid water 0°C to 100°C;

540 calories to move liquid water at 100°C to vapor at the same temperature.

On the other hand, we also see that water releases 720 calories per gram from vapor to ice. This process is called *deposition*.

Now let us make some comparisons of the energy required to change 1 gram of liquid substance to gram of vapor.

<u>Liquid</u>	<u>Energy required in calories</u>
Ammonia	295
Chlorine	67.4
Nitric Acid	115
Carbon dioxide	72.2
Ethyl Alcohol	236.5