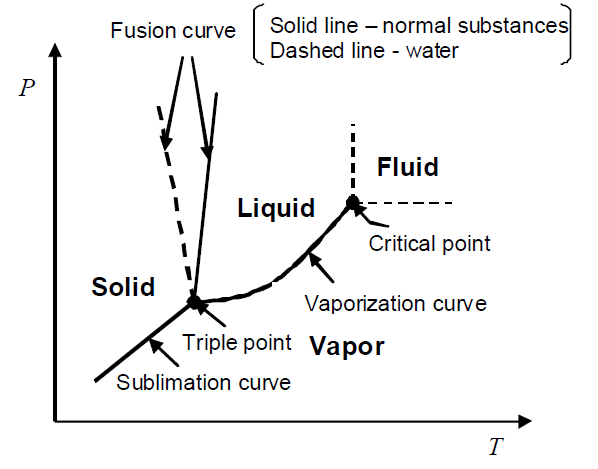
**Thermodynamic tables**

How were thermodynamic tables constructed?

* We can not compute the absolute values of H, U and S for the species at a specific T and P.
* The best thing is to choose a reference state and calculate by computing the changes and designate the computed values to the points at the corresponding T and P.

Below graph is the phase diagram that shows the phase transition curves and posseses the points in the thermodynamic tables.



You can easily notice that there is no point of termination below triple point on the sublimation curve however we have a point called critical point above triple point on vaporization curve. This point is referred to as critical point. At this point the pressure and temprature are called critical pressure and critical temperature, respectively. At pressures and temps exceeding this point, we name the susbtances as supercritical fluids. They are observed to possess both gaseous (viscosity, diffusivity, surface tension) and liquid properties (density). Such that they are able to diffuse into substances easily and dissolve susbtances. Delta H, S and V, they all approach zero as the critical point is approached.

* The negative slope of fusion curve for water is crucial to support life in frozen lakes and rivers. How?
* The fusion curve has a very steep slope indicating the triple point of most substances is close to their melting temperature at atmospheric pressure.
* **Critical point**
* Substances exist in the *fluid* region above Tc and Pc, called *supercritical fluids*.
* Coexisting phases are indistinguishable.
* Both gaseous and liquid properties are observed in the supercritical region.
* ∆S ̃, ∆H ̃ and ∆V ̃ approach zero as the critical point is approached.

Steam tables are the ones that show the properties (U, V, H and S) of species that are superheated steam or saturated liquid or saturated steam.

Reference: Richard M. Felder, Ronald W. Rousseau, Elementary Principles of Chemical Processes, 3rdEdition.