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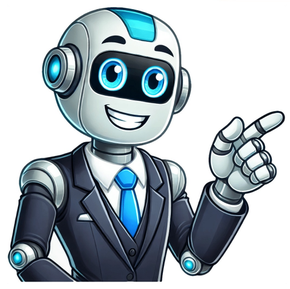

Define latent heat of vaporization with example

For the situation of 4He, this weight territory is somewhere in the range of 24.992 and 25.00 atm (2,533 kPa). What is Latent Heat? The heat of vaporization is the amount of heat that is to be added in order to transfer a liquid into a gas and the heat of freezing is the amount of heat that must be released for a liquid to freeze. The heat absorbed by the material, or the latent heat of fusion formula, is expressed as when m kg of solid converts to a fluid at a constant temperature, which is its melting point.Q = M x LWhereL is the substance's unique latent heat of fusion.The heat that the material absorbs or releases is expressed as when the temperature of the substance varies from t1 (low temperature) to t2 (high temperature).Q = mcΔtQ = mc(t₂ - t₁)The total amount of heat absorbed or liberated by the material isQ = mL + mcΔtSince the heat energy expected to shift the material from solid to fluid at air pressure during softening is the latent heat of fusion, and the temperature remains constant during the process, the 'enthalpy' of fusion is latent heat. This happens because the ice that is put on the drink will absorb a large amount of latent heat to melt. (2 marks) Ans. It can also refer to the quantity of heat energy received or emitted during a phase transition. (4 marks) Ans. Helium-3 has a negative enthalpy of fusion at temperatures beneath 0.3 K. Latent heat is the heat used to convert a solid to a liquid or vapour phase, or a liquid to a vapour phase. The specific latent heat is calculated using the formula, L = ΔQ/m In which, L is the specific latent heat ΔQ is the heat energy that is added or released and m is the mass of the substance that changes its physical state. When the heat of fusion is expressed in terms of a unit of mass, it is referred to as the specific heat of fusion, whereas the molar heat of fusion refers to the enthalpy change per mole of material. The steam is a result of the vaporization of water and the specific latent heat of the vaporization of water is immense. This is due to the assimilation of extra energy in the form of latent heat of vaporization.The heat of vaporization is characterized as the amount of energy (heat) required to convert 1g of a liquid into a gas without any change in the temperature of the liquid itself. The enthalpy of vaporization information is utilised in process estimations, for example, the plan of alleviation frameworks, including unpredictable mixes. This means that energy must be given to the solid in order to dissolve it, and energy must be discharged from a fluid as it solidifies since the particles in the fluid have a more delicate intermolecular force and therefore have higher potential energy (a sort of bond-separation energy for intermolecular powers).Solved Examples:1. As a result of the high heat of vaporization, the vanishing of water has an articulated cooling impact, and buildup has a warming impact. When latent heat is released into the atmosphere it affects the climate. The disappearance of water has an articulated cooling effect, while the buildup has a warming effect, due to the high heat of vaporization.The heat of vaporization is similar to the heat of fusion or melting in that it refers to the amount of heat exchanged during a stage change. Similarly, when a substance changes from a gas phase to a liquid, its density levels also need to go from a lower to a higher level, wherein the substance then needs to release or lose energy so that the molecules come closer together. Solution: Given,Q = 600 KcalM = 20 Kg Formula for latent heat is given as: L = Q ⁄ M = 600 / 20 = 30 Kcal/Kg Hence, the latent heat required for phase change is 30 Kcal / Kg. Example 2: Find the mass of ice required to lower the temperature of 500 g of water at 20°C to water at 0°C. Since water has such a high heat of vaporization, it's anything but difficult to get scorched by steam. Correspondingly, significant energy must be assimilated to change over fluid water to ice in a cooler. It changes from solid to liquid and the heat supplied is called the latent heat of fusion. The heat energy required to transform a solid into a fluid at atmospheric pressure is the latent heat of fusion while the temperature remains constant during the operation. The formula for specific latent heat is: L = Q/m where,L is specific latent heatQ is heat absorbed or releasedm is mass of a substance Sensible Heat The heat transferred by a body or thermodynamic system that affects the temperature of the body or system, as well as some macroscopic variables of the body or system except pressure or volume, is called sensible heat. Specific latent heat is defined as the amount of energy that is required per unit mass of a substance (ice) to change its physical state (water) at a constant temperature. Calculate the mass of the water that is produced. Putting out the fire using water Water when poured over fire becomes hot making it capable of absorbing a greater amount of latent heat from the fire. It is the amount of heat (540 cal g-1) needed to convert 1 g of water to 1 g of water fume in the case of vaporization. In the figure given above, the liquid is converting into vapour by heating.Particles of water vapour at 100°C (373K) have more energy than liquid water at the same temperature. Exploring the concept of Latent heat in physics, including the latent heat of fusion and latent heat of vaporization, and key assumptions in heating curve analysis, essential for JEE exams. Solid-to-Liquid: Latent Heat of Fusion Liquid-to-Gas: Latent Heat of Vaporization Solid-to-Gas: Latent Heat of Sublimation Formula for Latent Heat The formula for calculating the latent heat is given: Q = ML where, L is Latent HeatQ is Amount of Heat Released or AbsorbedM is Mass of Substance The heat Q that must be supplied or withdrawn for an object of mass M to change phases is stated in this equation. Scotch bourbon producers had employed Black to decide the best blend of fuel and water for refining and to examine changes in volume and weight at a steady temperature. In refining, the heat of vaporization esteems are expected to discover the heat loads for the reboiler and condenser, and information on the enthalpy of vaporization is required in the structure of heat exchangers for disintegrating fluids. The most well-known units of specific latent heat are joules per gram (J/g) and kilojoules per kilogram (kJ/kg). We will look at the idea of latent heat and the latent heat formula with examples in this article. 3.34 x 105 joules per kilograms is the latent heat of fusion of ice. This implies that at suitable steady weights, these substances solidify with the expansion of heat [2]. Latent Heat of Vaporization Latent heat of vaporization is the heat consumed or discharged when matter disintegrates, changing state from fluid to gas state at a consistent temperature. The heat of condensation, the heat of vaporization, and so on are some of the names given to it depending on the different phases. Things to Remember Latent heat is defined as the amount of heat that is radiated or absorbed at constant temperature and pressure, during the transition phase of a substance from one state to another. (3 marks) Ans. A similar measure of heat is traded or discharged in the stage move during the buildup of 1 g water fume to 1 g of water. Particles of water vapour at a temperature of 100oC (373K) is found to have more energy than water at the same temperature. Latent Heat of Sublimation When exposed to the open air, some chemicals, such as naphthalene, convert straight from solid to gas. The most widely seen changes while the temperature stays constant are state changes like solidifying, liquefying, vaporization or build-up. The temperature at that point stays consistent at the point of solidification while the water takes shape. Examples of Latent Heat : The main two examples of latent heat are the following: The heat of vaporization is the amount of heat that is to be added in order to transfer a liquid into a gas and the heat of freezing is the amount of heat that must be released for a liquid to freeze. However, when a substance has to change from gas to liquid phase, it needs to release energy to let the molecules and atoms come closer together. This latent heat amounts to 22.5×105 J/kg. Latent heat is defined as the heat or energy that is absorbed or released during a phase change of a substance. The 'enthalpy' of fusion is a latent heat, in light of the fact that during softening, the heat energy expected to change the substance from solid to fluid at air pressure is the latent heat of fusion, as the temperature stays steady during the procedure. Latent Heat of Fusion The latent heat of fusion is the heat consumed or discharged when matter melts, changing state from solid to fluid structure at a consistent temperature. So, we can use the formula, m = Q/L = 5.65 ×106 × 22.6 × 105 5.65 × 106 × 22.6 × 105 = 2.5 kg Thus, the mass of water produced is 2.5 kg Ques. Dark applied calorimetry for his investigation and recorded latent heat esteems. Latent heat of vaporization thus simply is the measure of heat that is absorbed or released to change a matter from its fluid state to gaseous state without bringing any variation to the temperature. The energy is viewed as "latent" on the grounds that it is basically covered up inside the atoms until the stage change happens. As far as the mechanism is concerned, latent heat is the work that is needed to overcome the attractive forces that hold molecules and atoms together in a substance. British physicist James Prescott Joule portrayed latent heat as a type of potential vitality. Some of the most common examples of latent heat observed in our daily life are, The temperature of the steam continues to stay steady till all the water particle changes their state even though heat is supplied. Check: Applications of Latent Heat in Daily Life Specific Latent Heat Specific latent heat is defined as the heat required to change the phase of one kg of any substance. At 20°C, a piece of metal has a density of 60g. Suppose a solid substance is changing to a liquid; it needs to absorb energy to push the molecules into a wider, more fluid volume. This implies that energy must be provided to the solid so as to dissolve it, and energy is discharged from a fluid when it solidifies on the grounds that the particles in the fluid experience more fragile intermolecular force, and thus have higher potential energy (a sort of bond-separation energy for intermolecular powers). Using salt to melt ice The specific latent heat of ice is more than that of water. The heat that is absorbed in the first case and that is released in the second so as to boil or melt a substance is what is latent heat. The concept of specific latent heat has some applications. The specific latent heat is the amount of energy required to change the state of 1 kg of the substance without changing the temperature of the substance. The latent heat of sublimation is the amount of heat required for a substance to change from a solid to a gaseous state or the amount of heat required to remove heat from a gaseous material to turn into its solid state. Latent heat of sublimation: the amount of heat or energy needed to transform a solid … The two examples of Latent heat are Latent heat of vaporization and Latent heat of Freezing. The latent heat of vaporization differs for various liquids. Amphibian researchers might be normally intrigued with the enormous measure of heat traded (80 cal g−1) in the stage move from water to ice or from ice to water, yet the measure of heat traded (540 cal g−1) in the stage move from water to water fume, or water fume to water is 6.75 times bigger (540/80 = 6.75). Since the temperature stays constant during the process, the formula does not have any temperature parameter. If the amount of heat needed for a phase change is 300 kcal, calculate the latent heat of a 5 kg material.Sol: Given parameters are,Q = 300 k.calM = 5 kgThe formula for latent heat is given by,L = Q / ML = 300 / 5L = 60 k.cal/kgHence latent heat value is 60 k.cal/kg2. The specific latent heat is calculated using the formula, L = ΔQ/m. Let's take an example. The two forms of latent heat are latent heat of fusion (melting) and latent heat of vapourisation (boiling). The fluid state has higher inward energy than the solid state. Despite the fact that the significance of this enormous measure of heat trade through vaporization or buildup might be undervalued by people, it is immense. It's worth noting that latent heat is associated with no change in temperature but a change in form. Latent heat is related to a heat property called enthalpy. The enthalpy shift of some measure of material as it dissolves is the latent heat of fusion.The real heat of fusion is defined as the enthalpy shift per mole of the matter when expressed in terms of a unit of mass, while the molar heat of fusion is defined as the enthalpy shift per mole of matter.The inward energy of the fluid state is greater than that of the solid-state. The graph given below shows, the change in various forms of matter and the heat related to each process. Thus, when salt is placed over a thick layer of ice, it absorbs energy from it, thus making the ice melt at a faster pace. The heat property enthalpy is related to latent heat.Here, we will learn about latent heat, different types of latent heat along with the formula and dimension of latent heat.Latent Heat EquationThe latent heat formula is given by,L = \[\frac{Q}{M}\]Where,L = specific latent heat of a substanceQ = amount of heatM = mass of the substanceLatent Heat Dimensional FormulaLatent heat dimensional formula is given by,[M⁰L²T⁻²]Where,M = MassL = LengthT = TimeLatent Heat of Vaporization FormulaThe heat absorbed or discharged as matter disintegrates, changing state from fluid to gas at a constant temperature, is known as latent heat of vaporization.The heat of water vaporization is the most well-known. Using cold water and ice to cool drinks Adding cold water or ice into a drink can help to make it cold. During the conversion of 1 g water fume to 1 g water, a comparable amount of heat is exchanged or discharged.Latent Heat of Fusion FormulaThe latent heat of fusion is the heat consumed or discharged as matter melts, changing state from solid to fluid structure at a constant temperature.Since sea ice and brine will exist together at any temperature and melt at a temperature other than 0C when bathed in a concentrated salt solution, the content of latent heat is complex in the case of sea ice, just as it is in the walls of brine cells when brine cells migrate. Actually, it is the direction of particles inside an atom, their substance holding, and their extremity that influence latent heat. Types of Latent Heat Transfer Lets us discuss some of the different types of latent heat that can occur. Reasonable Heat and Meteorology Meteorologists use reasonable heat to study the various parameters of the climate and predict the various natural events. Download Complete Chapter Notes of Thermodynamics Download Now However, an important point that we should consider regarding latent heat is that the temperature of the substance remains constant. Reasonable Heat and Meteorology While latent heat of combination and vaporization are utilised in material science and science, meteorologists also consider reasonable heat. Reasonable Heat Although reasonable heat is frequently called latent heat, it is anything but a steady temperature circumstance or is a stage change included. When immersed in a steam current at 100°C, 0.5g of the steam condenses on it. At the point when fluid water is cooled, its temperature falls relentlessly until it drops just underneath the line of the point of solidification at 0 °C. It may be from a gas to a liquid or from a liquid to a solid and back again. Latent heat of vaporization is the heat consumed or discharged when matter disintegrates, changing state from fluid to gas state at a consistent temperature. Example of Latent and Sensible Heat We see various examples of latent heat in our daily life. What is the energy that is required to change 0.65 kg of ice at 0°C into the water at 0°C ? Read More: Coefficient of Linear Expansion Latent Heat Formula [Click Here for Sample Questions] The formula for latent heat is given as Q = m x L In which, Q is the amount of heat that is absorbed or released m is the mass of the substance and L is the Specific Latent Heat The standard or the most common units that are used for latent heat are joules per gram (J/g) and kilojoules per kilogram (kJ/kg). The inward energy of the fluid state is greater than that of the solid state. The enthalpy of vaporization, ΔHv, is additionally named the "latent heat of vaporization." And ΔHv is the distinction between the enthalpy of the soaked fume and that of the immersed fluid at a similar temperature. Water has a high latent heat of combination, so transforming water into ice requires the expulsion of more energy than solidifying fluid oxygen into solid oxygen per unit gram. The latent heat of fusion of ice is 3.34 x 10^5 joules per kilograms (or, 3.34 x 10^5J/Kg).The enthalpy change during melting or fusion is the latent heat that measures the amount of substance dissolved when transforming from the state of solid to the liquid state. Similarly, the heat energy given to the liquid substance increases its temperature until it reaches its boiling point. It is similar to Latent Heat but the amount of substance is fixed to one kg. Give a brief account of the applications of Specific Latent Heat. On a worldwide scale, the apparently perpetual stage moves between fluid water and water fume in the climate are the key determinants in the redistribution of water and heat inside the hydrological cycle far and wide. Note that latent heat is related to no adjustment in temperature, yet a difference in the state. The heat of vaporization is characterized as the measure of heat that can transform 1g of a fluid into a fume at a constant temperature. We know that latent heat of fusion of ice 3.34 x 105 J/kg The latent heat formula is, L = Q/m In which, Q is the amount of heat that is absorbed or released m is the mass of the substance and L is the Specific Latent Heat So, to find the required energy Q, we have to use the formula, Q = L × m Here, L = 3.34 x 105 J/kg m = 0.65 kg Thus, Q = 3.34 × 105 × 0.65 = 217100 J Thus, the heat energy required to melt 0.65 kg water is 217100 J Ques. This means that energy must be delivered to the solid in order to dissolve it, and energy must be removed from a fluid when it solidifies because the particles in the fluid have a more fragile intermolecular force and so have larger potential energy (a sort of bond-separation energy for intermolecular powers). At boiling point, the heat energy supplied does not change the temperature of the liquid but the energy absorbed is required to change the phase of the substance. At the point when the heat of fusion is referenced to a unit of mass, it is typically called the specific heat of fusion, while the molar heat of fusion alludes to the enthalpy change per measure of substance in moles. It could either be from a gas to a liquid or liquid to a solid and vice versa. (2 marks) Ans. A gigantic measure of vitality is discharged when water bubbles are formed. Steaming of Food Food while being cooked is usually covered to stop the steam from escaping. Latent heat is the extra heat required to change the condition of a substance from solid to fluid at its softening point, or from fluid to gas at its breaking point after the temperature of the substance has come to both of these focuses. It changes liquid to gas and the heat supplied is called the latent heat of vaporization. Ques. Joule accepted that vitality relied upon the specific design of particles in a substance. The heat of vaporization of water is known to be the most elevated one. Solution: Heat absorbed by Ice = Heat released by water mIceL = mwatercΔθ Given,mwater = 500 g = 0.5 kgc = 4.2 J/ g°CL = 336 J /gΔθ = 20°C – 0°C = 20°C mIce×336 = 500×4.2×20 mIce = (500×4.2×20) / 336 = 125 g The required amount of ice is 125 gram Sign Up Now &Daily Live Classes3000+ TestsStudy Material & PDFQuizzes With Detailed Analytics+ More BenefitsGet Free Access Now The word "latent" has come from the Latin word "latere" which means to hide or cover up. Given, Specific latent heat of ice is 336 J /g, the Specific heat capacity of water is 4.2 J/ g°C. What is the latent heat of a substance with a mass of 10 kg if the amount of heat needed by it for the transition phase is 300 Kcal? At the melting point, the heat energy supplied does not change the temperature of the substance but the energy absorbed is required to change the phase of the substance. The latent heat of fusion is the enthalpy change of any measure of substance when it dissolves. At the point when latent heat is ingested or discharged, it produces insecurity in the climate, conceivably delivering an extreme climate. In simpler words, latent heat of fusion is the heat that is required to change a solid to liquid or a liquid to solid, without bringing any variation in temperature. The change in latent heat adjusts the temperature into contact with hotter or cooler air. The heat of water vaporization is the most well-known. The measure of heat that is either absorbed or released by a substance to directly transfer from solid to gaseous state or vice versa without bringing any variation in temperature is known as the latent heat of sublimation. Its unit is J⁄Kg Dimension formula for latent heat is [M0L2T-2] Type of Latent Heat Depending on the state of change in the matter, latent heat is generally categorized into three categories, which include Latent Heat of Fusion Latent Heat of Vaporization Latent Heat of Sublimation Latent Heat of Fusion The heat consumed or emitted when matter melts, changing state from solid to fluid-structure at a constant temperature, is known as latent heat of fusion. The energy or heat released or absorbed during a phase change of a material is known as latent heat. It is known by several names depending on its phase, such as the heat of condensation, the heat of vaporization, and so on. Latent Heat of Vaporization The heat consumed or expelled as matter disintegrates, changing phase from fluid to gas at a constant temperature, is known as latent heat of vaporization. The study of the above graph tells us that, The heat energy given to any solid substance increases its temperature until it reaches its melting point. This implies that energy has to be provided in order to dissolve a solid and energy must be released to solidify a liquid. Latent heat is thus the work that is done to overcome the attractive forces that are responsible for holding atoms and molecules together, thus, making a substance capable of transitioning between phases. Since ice is to be converted to water, it is the latent heat of fusion. Thus, the drink will lose heat making the drink cool. conceivably delivering an extreme climate. They are: Latent Heat of Fusion Latent Heat of Vaporization Latent Heat of Sublimation Here is a detailed description of each of the following. In essence, this energy that is required by a substance to either freeze, melt or boil is said to be latent heat. … Latent heat of vaporization: the heat required to convert the substance from liquid to gas and vice-versa. Latent Heat of Fusion The absorption or discharge of heat at a constant temperature when a matter changes from solid to liquid and vice-versa is defined as the latent heat of fusion. Both latent and reasonable heat cause air to move, creating wind and vertical movement of air masses. Types of Latent Heat Transfer [Click Here for Sample Questions] Latent Heat Transfer can occur mainly in three types. If the steam stays, the food becomes capable of absorbing this heat, thus helping in cooking the food faster. The heat of vaporization is the amount of heat that is to be added in order to transfer a liquid into a … For vaporization, it is the amount of heat (540 cal g−1) expected to change over 1 g of water to 1 g of water fume. This explains the concept of latent heat which is the extra heat required to change the state of a substance, for example, if a substance is in the solid-state, latent heat provides the extra energy to change its state to liquid and then from the liquid state to the gaseous state. The temperature stays constant at its point, allowing the liquid to solidify. Calculate its latent heat. The heat of vaporization of water is the highest known. Latent heat is called by various names depending upon the phase it changes. At the point when enough vitality is provided, fluid water grows from the water fume and the water bubbles. The cooler expels heat energy to permit the stage progress to happen. The absorption or discharge of heat at a constant temperature when a matter changes from solid to liquid and vice-versa is defined as the latent heat of fusion. This term isn't in the rundown of definitions given by Weast (1964), so the definition originates from Webster's New World Dictionary of the American Language (1959). The heat or energy required to do these physical changes are called 'latent' as they are seen to be covered up inside the atoms until the change of state happens. Ques. The heat or energy consumed or emitted during a phase change of a material is known as latent heat. Instances of Latent and Sensible Heat Everyday life is loaded up with instances of latent and reasonable heat: Bubbling water on a stove happens when warm vitality from the heating component is moved to the pot, and thus to the water. The units are cal/gram. On a little yet basic scale forever, water dissipating off sweating warm-blooded creatures, including people, keeps up internal heat levels inside thin survivable points of confinement. Helium-4 additionally has a marginally negative enthalpy of fusion underneath 0.77 K (−272.380 °C). The heat of vaporization is latent heat. Specific latent heat is an escalated property of the issue. The disappearance of water has an obvious cooling effect, whereas the accumulation has a warming effect, due to the high heat of vaporization. The absorption or release of heat at a constant temperature when a matter disintegrates from fluid state to gaseous state is called the Latent heat of Vaporization. The heat can be "detected" as an adjustment in an item's temperature. The temperature of the boiling water remains at 1000C till the last drop evaporates is an example of latent heat. A thermometer cannot measure latent heat. [Click Here for Sample Questions] Specific latent heat is defined as the amount of energy that is required per unit mass of a substance (ice) to change its physical state (water) at a constant temperature. Early Developments of the Concept The Scottish scientific expert, Joseph Black, presented the idea of latent heat somewhere close to the period 1750 and 1762. From the question, we have, The required heat, Q = 400 k.cal Mass of the substance, m = 2 kg The latent heat formula is, L = Q/m In which, Q is the amount of heat that is absorbed or released m is the mass of the substance and L is the Specific Latent Heat Applying the values in the formula, we get, L = 400/2 = 200 k.cal/kg Thus, the latent heat of the substance is 200 k.cal/kg Read More: Latent heat is the heat required to transform a solid into a liquid or vapour phase. Provided that the latent heat of steam is 540 cal/g, calculate the specific heat of the metal.Sol: Let c be the specific heat of the metal.Heat gained by the metalQ = mcΔt⇒ Q = 60 x c x (100 - 20)⇒ Q = 60 x c x 80 calThe heat released by the steamQ = m × LQ = 0.5 × 540 calBy the principle of mixtures,Heat given is equal to Heat taken0.5 × 540 = 60 × c ×80c = 0.056 cal/g ^{0}CHence specific heat value is 0.056 cal/g ^{0}CHence, we can conclude that The specific latent heat (L) of a material:It is a measurement of the amount of heat energy (Q) emitted or absorbed per mass (m) during a phase shift.The formula Q = mL is used to describe it.It's commonly referred to as the material's "latent heat."The joule per kilogramme [J/kg] is the SI unit.We have all three types of latent heat and dimension of latent heat. We have solved a few example problems. The enthalpy shift of any solid as it melts is known as the latent heat of fusion. Similar to the case for 'Heat of Fusion/Melting,' the heat of vaporization/buildup additionally speaks to the measure of heat traded during a stage move. The liquid state of a substance requires higher inward energy to convert to the solid-state which means energy must be provided to the solid-state to convert the substance into its fluid state, therefore, when the substance converts back to its solid-state, it releases energy in the form of latent heat.Therefore, the enthalpy of melting is, mostly, a positive quantity with the exception of Helium-3.Latent Heat of VaporizationThe term latent heat of vaporization is the amount of heat required for the transformation of a liquid at its boiling point to gas at a constant temperature. In order to achieve the proper transition, the substance will absorb energy to push the atoms and molecules away from each other. The vertical movements of air or wind are caused by the latent heat released or absorbed by land or water. All the water freezes at the same temperature even though heat is continuously absorbed. (3 marks) Ans. This is the result of the presence of extra heat in water vapour in the form of latent heat of vaporization. Latent Heat of Sublimation Substances like naphthalene and camphor are capable of getting directly transformed into a gaseous state from solid-state. 400 k.cal heat is required to change the state of a 2 kg substance. Specific Latent Heat Specific latent heat is characterised as the measure of heat energy (heat, Q) that is consumed or discharged when a body experiences a steady temperature process. Therefore, like the heat of fusion, the latent heat of vaporization measures the heat given to a liquid in order to change its state into its gaseous state. The heat of vaporization is described as the amount of heat required to convert 1 g of a fluid into a fume without changing the fluid's temperature.Heat of Vaporization FormulaThe heat of vaporization formula can be written as based on entropy and enthalpy of vaporization, as well as their relationship.H\[_{v}\] = \[\frac{q}{m}\]WhereH\[_{v}\] = vaporization heatm = mass of the substanceq = heatWe should note that the latent heat is associated with no change in temperature but a change in state. The heat of vaporization is characterised as the measure of heat expected to transform 1 g of a fluid into a fume without a change in the temperature of the fluid. The inward energy is higher in the fluid state than in the liquid state. Steam is converted to water here so, Latent heat of vaporization = 22.6 × 105 J/kg The latent heat formula is, L = Q/m In which, Q is the amount of heat that is absorbed or released m is the mass of the substance and L is the Specific Latent Heat Here, we have to find the mass of water produced. The formula for specific latent heat is: L = Q/m Where: L is the specific latent heat Q is the heat retained or discharged m is the mass of a substance The most widely recognised kinds of consistent temperature forms are stage changes, for example, liquefying, solidifying, vaporization, or buildup. Reasonable heat reflects heat move among an item and its environment. It might be from a gas to a liquid or from a liquid to a solid and back again. [Click Here for Sample Questions] The temperature of the substance remains constant throughout the process. The heat of vaporization is defined as the amount of heat required to convert 1 g of a fluid into a fume without changing the fluid's temperature. After a substance's temperature has reached a breaking point, latent heat is necessary to change the state of the substance from fluid to gas at this point. The reasonable heat absorbed and released into the atmosphere interacts with the hot or cold air and changes the climatic condition. The two examples of Latent heat are Latent heat of vaporization and Latent heat of Freezing. Unit of Latent Heat Latent heat is nothing but the heat required per kg to change the phase of any substance. In order to produce water at 100°C, 5.65 × 106 J of heat energy is released from a mass of steam at 100°C. Also, Read Heat Capacity Heat Transfer Formula Difference between Heat and Temperature Solved Examples on Latent Heat Example 1: Find the latent heat of a 20 kg substance if the amount of heat required for the phase change is 600 kcal. They are as follows. When the water is totally solidified, its temperature keeps on falling. The enthalpy of fusion is quite often a positive amount; helium is the main known exception. Here, Q = 300 Kcal M = 10 kg The latent heat formula is, L = Q/m Applying the values, we get, L = 300/5 = 60 k.cal kg-1 Hence the latent heat of the substance is 60 k.cal kg-1 Ques. In case of water, the latent heat to transform it into vapour is the energy of boiling water at which it changes form without change in temperature. Latent heat is denoted by the letter L. This heat is required apart from the heat given to melt or vaporize the substance and it works without raising or decreasing the actual temperature of the substance no matter which state it is currently in.Latent Heat of FusionThe latent heat of fusion or melting, of a solid, is the quantity of heat in joules required to transform a solid, at its melting point, to a liquid without any variation in temperature. When a fluid is cooled, its temperature falls until it drops just underneath the point of solidification. Consider that a solid substance is transitioning to a liquid state. The word latent originates from the Latin word latere, which intends to lie covered up or hidden.