

Answer on Question #65572, Physics / Mechanics | Relativity

Give scientific reasons:

(1) Viscosity decreases by increasing temperature.

(2) The boiling point of liquid remains constant although heat is continuously supplied to the liquid.

(3) Pressure cooker is used for rapid cooking.

Answer:

(1)

When you consider a liquid at room temperature, the molecules are tightly bound together by attractive inter-molecular forces (e.g. Van der Waal forces). It is these attractive forces that are responsible for the viscosity since it is difficult for individual molecules to move because they are tightly bound to their neighbors.

The increase in temperature causes the kinetic or thermal energy to increase and the molecules become more mobile. The attractive binding energy is reduced and therefore the viscosity is reduced.

Source: <http://www.azom.com/article.aspx?ArticleID=10036>

(2)

Boiling point (B.P.) is the temperature at which vapour pressure of liquid becomes equal to atmospheric pressure. Initially, the heat supplied to a liquid is mostly consumed in increasing the average kinetic energy of the molecules or simply the temperature of the liquid, which leads to increase the rate of evaporation till the liquid starts boiling. At B.P. the molecules of liquid attain maximum average kinetic energy (K.E.) and any further increase in heat does not affect the temperature. Instead of raising the temperature of the liquid, the heat supplied is used to overcome the intermolecular attractive forces and excessive energy is carried away by the liquid molecules into their vapour state. Heat is taken away by the escaping molecules (vapours) in the form of Latent Heat of Vaporization. Thus the average K.E. of liquid molecules or the temperature of liquid at B.P. remains constant at its maximum. Therefore, the B.P. of liquid remains constant, although heat is continuously supplied to it at its B.P.

Source: <https://m.facebook.com/NCC.Chemistry/posts/590574777712016>

(3)

Pressure cooker is a closed container where vapours are not allowed to escape which are accumulated over the surface of the liquid exerting more vapour pressure. The cooker works by raising the temperature of boiling water, thereby speeding up the time it takes to boil, braise, or steam. To use a pressure cooker, you put the food in the pot with some liquid-usually a minimum of 2 cups to build up sufficient steam pressure. Once the lid is locked in place and the cooker is set

on high heat, steam develops in the pot and can't escape. The trapped steam increases the atmospheric pressure inside the cooker. At that pressure, the boiling point of water is increased from 100°C (212°F) to 130 °C 250°F. This higher temperature is what cooks food faster.

Source: <http://www.finecooking.com/item/49607/the-science-of-pressure-cookers>

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