

Answer on Question #58115, Physics / Molecular Physics | Thermodynamics |

5 Thermal expansion of a solid material depends on the following EXCEPT
the nature of the material making up the solid
the range of the temperature change
the initial dimensions of the solid
average translational motion of constituent atoms of the material

Solution:

The change in length ΔL is proportional to length L . The dependence of thermal expansion on temperature, substance, and length is summarized in the equation

$$\Delta L = \alpha L \Delta T,$$

where ΔL is the change in length L , ΔT is the change in temperature, and α is the coefficient of linear expansion, which varies slightly with temperature.

Answer: average translational motion of constituent atoms of the material

6 One of these is NOT a basic assumption of kinetic theory of ideal gases
a gas consist of a large number of molecules
the attraction between the molecules is negligible
the kinetic energy of the molecules is changing continuously
the gas molecules are in a state of continuous random motion

Solution:

The theory for ideal gases makes the following assumptions:

- The gas consists of very small particles known as molecules.
- These particles have the same mass.
- The number of molecules is so large that statistical treatment can be applied.
- These molecules are in constant, random, and rapid motion.
- The rapidly moving particles constantly collide among themselves and with the walls of the container.
- Except during collisions, the interactions among molecules are negligible.

Answer: the kinetic energy of the molecules is changing continuously

7 One of these is an example of thermal radiation detector

bolometer

thermometer

thermal rod

thermal glass

Solution:

Radiation detectors consisting of a solid that is sensitive to radiation constitute the most extensive group. They include **bolometers**, in which the resistance to electric current changes as a result of the absorption of radiation; **thermocouples**, which produce an electromotive force in response to heating by radiation; and **pyroelectric radiation detectors** fabricated from ferroelectric crystals.

All of these types are classified as thermal radiation detectors, since it is the heating of the substance by radiation that plays the main role in the energy-conversion mechanism.

Answer: bolometer