Thermodynamic theorems

First law of thermodynamics

The first law of thermodynamics is based on the law of conservation of energy; determines the increase in internal energy of the system.

For a given system, we can formulate it as:

$$\Delta U = Q + W$$

When ΔU is the total increase in internal energy of the given system, Q is the heat given to the system by the surroundings, and W is the total work done by the environment on the system.

In differential form:

$$\mathrm{d}U = \mathrm{d}Q + \mathrm{d}W$$

In the case of an equation in differential form, the values are not changed over the duration of the entire event, but over an infinitely short period of time. Iron

Second law of thermodynamics

When two bodies of different temperatures come into contact, heat cannot spontaneously pass from a colder body to a hotter one, i.e. it is not possible to construct a periodically working heat engine (perpetuum mobile of the second kind), which would permanently do work only by cooling one body and no further change in the surroundings would occur (see entropy).

Third law of thermodynamics

At absolute zero temperature (T = 0 K), the entropy of a pure solid or liquid substance is zero. A pure solid cannot be cooled to absolute zero temperature by a finite process.

The so-called zeroth law of thermodynamics

If two or more bodies are in thermodynamic equilibrium with another body, all these bodies are in equilibrium.

Links

Related Articles

- Thermodynamic system
- Thermodynamic equilibrium
- Free energy
- Enthalpy
- Entropy

Source

- KUBATOVA, Senta. *Biofot* [online]. [cit. 2011-01-31]. <https://uloz.to/!CM6zAi6z/biofot-doc>.

- MARŠÁK, Zlatěk. Termodynamika a statistická fyzika. 3. vyd. Praha: Vydavatelství ČVUT, 1995, s. 23-25. ISBN 80-01-01401-0.