

كيمياء

تعريفات الثيرمودينامكس

م.إسراء شوقي



is a thermodynamic quantity equivalent to the total heat of the system	Enthalpy
Is a thermodynamic quantity equivalent to energy difference between reactants and products تفاضل	Free energy change تغير طاقة حرة للنظام
the real or imaginary surface that separates the system from the surrounding. سطح يفصل	Boundary layer
Both mass and energy can transfer across the boundary of the system. ✓ m ✓ E	open system
No mass can enter or leave the boundary but energy can enter or leave the boundary in the form of heat ✓ E X m	Closed system
No mass or energy can enter or leave the system across the boundary of the system. X m X E (special case of closed system) العازل	Isolated system
① Energy cannot be created or destroyed	First law of thermodynamics
② The total amount of energy of the system and the surrounding are constant	
③ During the interaction between surrounding and the system the amount of energy gain by the system must be exactly the same as amount of energy lost by the surrounding.	
The process at which the system doesn't lose or gain heat (isolated system) عملية لا يتم فيها تبادل حرارة واداء فقط اكتساب	Adiabatic changes
a special device that converts the heat into work لتحويل	Heat engine المحرك الحراري
The ratio of total work output to total heat input النسبة	Thermal efficiency (η) كفاءة حرارية
① It is impossible for any device that operates on a cycle to receive heat from a single reservoir and produce net amount of work. (Kelvin-Planck statement) مستوعب حراري	Second law of thermodynamics
② no heat engine has a thermal efficiency 100% (Clausius) كفاءة حرارية	
③ It is impossible to construct a device that operates on a cycle and produce no effect other than the transfer of heat from a lower temp to a higher temp body نقل	Third law of thermodynamics
as the system approaches absolute zero all processes cease and the entropy approaches a minimum value توقف تساوي	
Thermodynamic quantity measure the degree of disorder and randomness of the system تقيس	Entropy

The science of energy and its transformations

Thermodynamics

All the energy forms outside the system

Macroscopic energy

All energy forms related to the ^{بنية}structure of the molecules and degree of the molecules activity ^{النشاط}

Microscopic energy

① The total amount of energy is constant

Conservation of energy

② Energy can be ~~neig~~ neither created nor destroyed
لا تفسد ولا تسجد

قانون بقاء الطاقة

All the sum of the microscopic energy
مجموع صور

Internal energy (U)
الطاقة الداخلية

The energy that the system has as a result of its motion
حركته

Kinetic energy (K.E)
 $= \frac{1}{2}mv^2$

The energy that the system has as a result of its elevation in a gravitation field
ارتفاع
مجال الجاذبية

Potential energy (P.E)
 $= mgz$

The force required to accelerate 1 Kg of a body by rate of $1m/s^2$

Newton

The force required to accelerate the body of 32.127 lbm by a rate of $1lb/s^2$

lbf Force

① The amount of heat required to rise the temp of 1 gram of distilled water 1°C from 14.5 to 15.5
عد ميل انصاف
② The amount of heat required to rise the temp of 1bm of distilled water 1°F

Calory

The amount of heat required to rise the temp of 1 gram of matter 1°C

Specific heat (S)
الحرارة النوعية

The amount of heat required to rise the temp of all body 1°C
اللزجة

heat Capacity (C)
السعة الحرارية

It is the weight of unit volume of the substance
 $= (\rho g) \times \text{حجم}$
وزن وحدة الحجم من المادة

Specific weight
الوزن النوعي

The quantity of matter or a region of space chosen for study
كمية
جزء من الكون محل دراسة

System
النظام

the mass or a region outside the system
باعتبار أنه كدما هو خارج النظام

Surrounding
الوسط المحيط