

Obj. #1. Introduction to thermo.

- ✓ 1. What is thermo
  2. Key concepts.
  3. Basic problem of thermo.
  4. Fundamental Eqs. & Postulates.
- 

2. Key concepts.

- 2-1. • system: All the substance being studied.
- surrounding: the rest of the universe.



	matter	Energy
open sys	✓	✓
closed sys	✗	✓
isolated sys	✗	✗

\*. Parameters

↳ Internal Energy: Energy necessary to create a sys. in its given state.

- NOT include:  $\frac{P^2}{2M} + V(R)$  of sys. a whole.
- include:  $\sum_i \frac{\tilde{p}_i^2}{2m_i} + \sum_i V(r_i) + \sum_{i,j} V(r_{i,j})$

# Microscopic kinetic & potential.

→ Macroscopic parameters

$(V, N_1, N_2, \dots, N_r)$

extensive parameters.

$T^I = T_0$      $T^{II} = T_0$

$V^I, N_1^I, N_2^I$	$V^{II}, N_1^{II}$
$\dots N_r^I$	$N_2^{II}, \dots N_r^{II}$

$V = V^I + V^{II}$

$U = U^I + U^{II}$

$N_1 = N_1^I + N_1^{II} \dots N_r = N_r^I + N_r^{II}$

Intensive Parameter:  $\left\{ \begin{array}{l} T \neq T^I + T^{II} \\ T = T_0 \end{array} \right.$

\* Postulate 0: There exist particular states (i.e., equilibrium states) of simple sys. that macroscopically are characterized by the  $U, V, N_1, N_2, \dots, N_r$  of the component.

\* equilibrium state: no spatial &/or temporal variations.

A terminal state, time-independent macroscopically