

# 科学技術英語2C

第7回

大槻 東巳

まずは元素を読む

$y = f(x)$   $y$  equals  $f$  of  $x$ .

$a \neq b$   $a$  is not equal to  $b$ .

$a > b$   $a$  is greater than  $b$ .

$a < b$   $a$  is less than  $b$ .

$a \geq b$   $a$  is greater than or equal to  $b$ . /  $a$  is equal to  $b$  or greater.

$a \leq b$   $a$  is less than or equal to  $b$ . /  $a$  is equal to  $b$  or less.

$a \gg b$   $a$  is much greater than  $b$ .

$a \ll b$   $a$  is much less than  $b$ .

$a + b > c$   $a$  plus  $b$  is greater than  $c$ .

$2a + b \leq c$  Two  $a$  plus  $b$  is less than or equal to  $c$ . / Two  $a$  plus  $b$  is equal to  $c$  or less.

$a \rightarrow b$   $a$  tends to  $b$ . /  $a$  approaches  $b$ .

$a \approx b$   $a$  is nearly equal to  $b$ . /  $a$  is approximately equal to  $b$ .

$a \equiv b$   $a$  is identical with [to]  $b$ .

$a \not\equiv b$   $a$  is not identical with [to]  $b$ .

$a \perp b$   $a$  is perpendicular to  $b$ .

$a \parallel b$   $a$  is parallel to  $b$ .

$a \sim b$   $a$  is asymptotic to  $b$ .

$a \propto b$   $a$  is proportional to  $b$ . /  $a$  is in proportion to  $b$ .

$a \propto 1/b$   $a$  varies inversely with  $b$ . /  $a$  is inversely proportional to  $b$ .

$\angle A = \angle B$  Capital  $a$  has the same angle as capital  $b$ . / The angle  $A$  is equal to the angle  $B$ .

$\overline{ABC} \equiv \overline{DEF}$  All capital  $abc$  coincides with all capital  $def$ .

# heat, temperature

- temperature; measure of the total kinetic energy in a substance.
- heat; the energy transferred from one object to another because of a temperature difference between them.
- specific heat; the quantity of heat required to change the temperature of a unit mass of the substance by 1 degree.

# words

- work, internal energy, heat engine, internal-combustion engine, efficiency
- thermal expansion
- ice, liquid water, water vapor
- absolute zero of temperature

# heat transfer

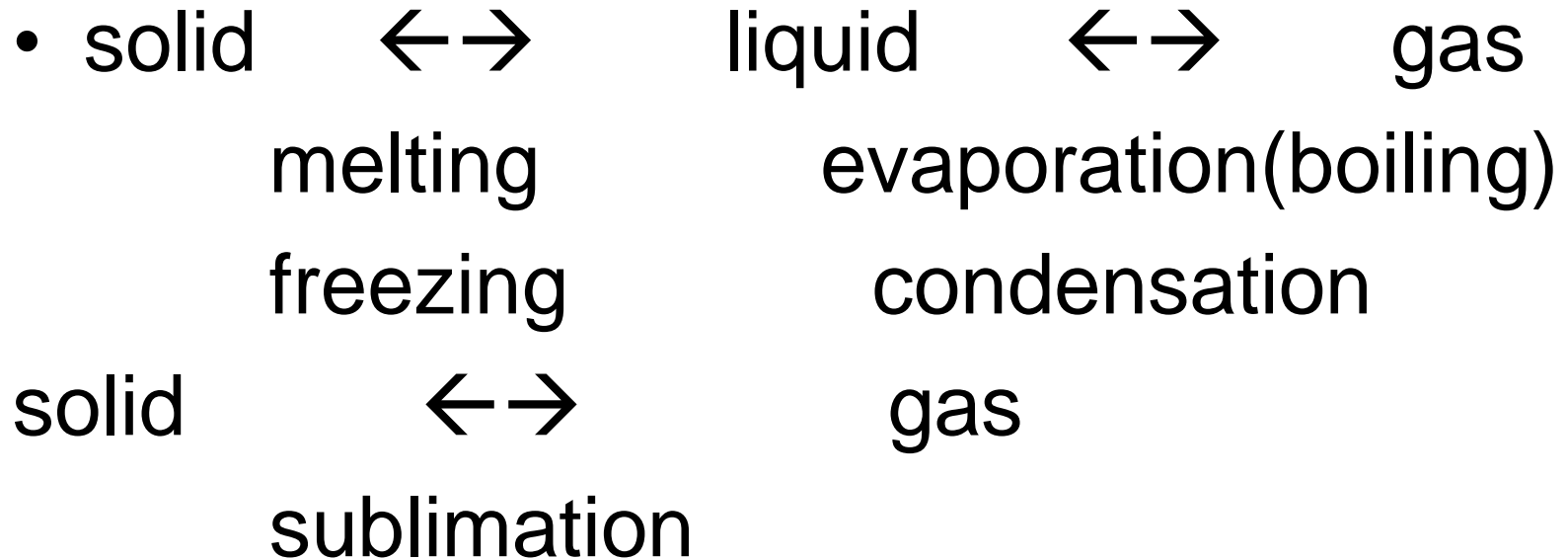
- conduction, convection, radiation
- (熱)伝導, 対流, 放射
- Newton's law of cooling: Rate of cooling is proportional to the temperature difference.-> Quiz: Write down this statement in a equation.

# environmental sciences

- greenhouse effect: the warming of the lower atmosphere, the effect of atmospheric gases on the balance of terrestrial and solar radiation.
- solar radiation-> short wave length
- terrestrial radiation->long wave length
- Carbon dioxide absorbs and reemits long wave length back to earth.

- solar power: solar constant ( $1.4\text{kW/m}^2$ ).
- The solar power received in US, averaged over day and night, summer and winter, is  $13\%=0.18\text{kW/m}^2$ .

# change of phase



- latent heat of fusion ( $\doteq 80$  cal/g for water)
- latent heat of vaporization ( $\doteq 540$  cal/g for water)



# thermodynamics

- 1st law of thermodynamics:
  - When the law of energy conservation is enlarged to include heat, we call it the first law of thermodynamics. We state it generally in the following form: **When heat flows to or from a system, the system gains or loses an amount of energy equal to the amount of heat transferred.**
  - エネルギーの保存則を熱まで含めるように拡張したのが、熱力学の第1法則である。これは以下のような形で述べられる: **熱がある系から別の系に流れると、移動した熱の分だけ系のエネルギーは増大したり、減少したりする。**
- 2nd law of thermodynamics:
  - The second law identifies the direction of energy transformation in natural processes. The second law of thermodynamics can be stated in many ways, but most simply, it is this: **Heat of itself never flows from a cold object to a hot object.**

学籍番号

氏名

# quiz

- 前スライドの熱力学の第2法則を和訳せよ。