🌡️ The six phase changes

六种相变

Date · 日期 _____ Topic · 知识点 1/3

CUES · QUESTIONS

提示 · 问题

1. Solid → gas directly?
   > 固体直接变气体?
2. Gas → solid directly?
   > 气体直接变固体?
3. Gas → liquid?
   > 气体变液体?
4. Liquid → gas (class name)?
   > 液体变气体（课堂用名）?

Cover the notes. Answer each cue from memory. · 盖住右边的笔记，凭记忆回答每个提示。

NOTES

笔记

1 · Worked example · 1 · 看一道例题 Copy one example from the page. Next to each line write WHY in a few words. · 抄一道例题，每一行旁边用几个字写「为什么」。

2 · Fill in the blanks · 2 · 填空题 Cover the steps and redo it. Leave a gap where you are unsure. · 盖住步骤自己重做，不确定的地方先空着。

3 · Your turn · 3 · 自己做 A new question. Then check it against the answer. · 做一道新题，然后对答案。

SUMMARY — IN MY OWN WORDS, TWO SENTENCES

小结——用自己的话，两句

🌡️ Heating curve of water

水的加热曲线

Date · 日期 _____ Topic · 知识点 2/3

CUES · QUESTIONS

提示 · 问题

1. Diagonal line on a heating curve?
   加热曲线上的斜线?
2. Horizontal line?
   水平线?
3. Water: melting and boiling temperatures?
   水的熔点和沸点?
4. Why is the temperature constant during boiling?
   为什么沸腾时温度不变?

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SUMMARY — IN MY OWN WORDS, TWO SENTENCES

小结——用自己的话，两句

🌡️ Kinetic energy: rotational, vibrational, translational

动能：转动、振动、平动

Date · 日期 _____ Topic · 知识点 3/3

CUES · QUESTIONS

提示 · 问题

1. Kinetic energy?
   > 动能?
2. Temperature increases → ?
   > 温度升高 → ?
3. Rotational?
   > 转动?
4. Vibrational?
   > 振动?

Cover the notes. Answer each cue from memory. · 盖住右边的笔记，凭记忆回答每个提示。

NOTES

笔记

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SUMMARY — IN MY OWN WORDS, TWO SENTENCES

小结——用自己的话，两句

🌡️ Phase Changes & Energy

相变与能量

• Formula and trap sheet

公式与陷阱一页纸

Everything you need before a test, on the fewest pages. Fold it and keep it in your binder. · 考前要看的东西，压缩在尽量少的页数里。折起来放进文件夹。

The six phase changes · 六种相变

REMEMBER · 记住

- s→l melting · l→s freezing · l→g evaporation · g→l condensation
  > 固→液 熔化 · 液→固 凝固 · 液→气 汽化 · 气→液 液化
- s→g sublimation · g→s deposition (both skip the liquid)
  > 固→气 升华 · 气→固 凝华（都跳过液态）

WATCH OUT · 当心

- Frost = freezing ✕ → frost = deposition (vapour → ice) ✓
  > 霜＝凝固 ✕ → 霜＝凝华（水蒸气 → 冰）✓

Heating curve of water · 水的加热曲线

FORMULAS · 公式

diagonal ⇒ temperature changes; horizontal ⇒ phase changes — The one rule for reading any heating or cooling curve

> 读任何加热或冷却曲线的唯一规则：斜线 → 温度变；水平线 → 相变

REMEMBER · 记住

- Diagonal = temperature changing (one phase). Horizontal = phase changing (two phases), T constant.
  > 斜线＝温度变（一个相）。水平线＝相变（两个相），温度不变。
- Water: 1 ice warms · 2 melts at 0 °C · 3 liquid warms · 4 boils at 100 °C · 5 steam warms.
  > 水：1 冰升温 · 2 0 °C 熔化 · 3 液体升温 · 4 100 °C 沸腾 · 5 水蒸气升温。

WATCH OUT · 当心

- Heat added → temperature must rise ✕ → not on the flat parts ✓
  > 加热 → 温度一定升 ✕ → 水平段上不升 ✓
- Flat part = one phase ✕ → two phases together ✓
  > 水平段＝一个相 ✕ → 两个相共存 ✓

Kinetic energy: rotational, vibrational, translational · 动能：转动、振动、平动

REMEMBER · 记住

- Kinetic energy = energy of motion; temperature up → faster → more kinetic energy.
  > 动能＝运动的能量；温度升 → 更快 → 动能更大。
- Rotational spins (bonds same) · vibrational stretches/bends in place · translational moves place to place.
  > 转动：旋转（键不变）· 振动：原地伸缩弯曲 · 平动：从一处移到另一处。

WATCH OUT · 当心

- Vibrating molecule moves across the box ✕ → vibration is in place; moving across is translational ✓
  > 振动的分子会穿过盒子 ✕ → 振动在原地；穿过盒子是平动 ✓