

CHEM 36
General Chemistry
Quiz #1

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1. Why is there water in the gas phase above liquid water at temperatures below 100°C?

The water molecules at the surface have a kinetic energy distribution in which a specific fraction have sufficient K.E. to overcome the intermolecular attractive forces keeping them in solution. Thus, a small fraction of the water molecules can escape the liquid phase and enter the gas phase above the liquid.

2. What is the pressure of the water in the gas phase above liquid water **at** 100°C?

By definition, the pressure of water in the gas phase is equal to atmospheric pressure *at its boiling point*. So, the vapor pressure of water at its boiling point is:

1 atm.

3. Arrange the following substances in order of *increasing* boiling point: H₂O, Ar, NaCl.

Ar, H₂O, NaCl

At room temp: argon is a gas, H₂O is a liquid, and NaCl is a solid.

4. VERY briefly explain why the boiling points in the previous problem increase in the way that you indicated.

Boiling points will increase with increasing intermolecular force strength:

Argon: nonpolar, London Forces (weakest)

H₂O: polar, Hydrogen Bonding (strong)

NaCl: Ionic Bond (VERY strong - a BOND!)