

Gas Solubility and Related Concepts Explained

<https://gemini.google.com/app/e1037932aae70faf>

Response: The correct statement is **(3)**.

Here is a quick evaluation of each option:

- **(1) Incorrect:** Water is a polar solvent ("like dissolves like"). Polar gases (such as NH_3 or HCl) generally have higher solubility in water than non-polar gases (such as O_2 or N_2).
 - **(2) Incorrect:** Not all gases undergo ionization in aqueous solution. Non-polar or unreactive gases like noble gases (He , Ar) or hydrocarbons (CH_4) dissolve strictly as molecules without ionizing.
 - **(3) Correct:** According to **Henry's Law**, the concentration/solubility (C) of a dissolved gas in a liquid is directly proportional to the partial pressure (P) of that gas above the liquid at a constant temperature ($C = k \cdot P$).
 - **(4) Incorrect:** Increasing external pressure increases the boiling point of water because the vapor pressure must reach a higher value to equal the atmospheric pressure.
 - **(5) Incorrect:** The triple point of water is a fixed thermodynamic point (defined at specific, fixed values of temperature and pressure: 0.01°C or 273.16 K at 611.65 Pa). It does not change with varying pressure.
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