

Solubility Homework

In each of the following problems, circle the solute that will be more soluble in the solvent listed. You may find it useful to draw the Lewis structures of the solvent and solutes (where applicable).

- 1) Solvent: water. Solute: **lithium chloride** or **carbon tetrafluoride**.
- 2) Solvent: CS₂. Solute: **PF₃** or **BF₃**.
- 3) Solvent: CH₃OH. Solute: **N₂H₄** or **Si₂H₆**.
- 4) Solvent: water. Solute: **nitrogen** or **sulfur difluoride**.
- 5) Solvent: H₂S. Solute: **sodium hydroxide** or **boron trichloride**.
- 6) Solvent: NF₃. Solute: **CF₄** or **SiOF₂**.
- 7) Solvent: HF. Solute: **nitrogen trichloride** or **nitrogen triiodide**.
- 8) To make iced tea, the following steps are taken: First you add tea bags to hot water until the water is medium brown. Ice cubes are then added to chill the beverage to a drinkable temperature. If you wanted to make sweet tea (tea with sugar), at what stage in this process would you add the sugar to ensure maximum sweetness? Explain.
- 9) Sugar cubes are not solid crystals of sugar; they are sugar crystals that are compacted together into cube shapes. When sugar cubes are placed in water, they fall apart into their individual crystals very quickly. Based on what you know of solubility, why are sugar cubes made in this way?
- 10) Carbon dioxide has a solubility of 1.45 g/L at 1.00 atm. If we increased the partial pressure of carbon dioxide to 4.50 atm, what will be the new solubility of carbon dioxide in water?