

Which compound would be least soluble in water?

1. $\text{CH}_3\text{CH}_2\text{CH}_2\text{CH}_2\text{CH}_2\text{CH}_3$
2. CH_3OH
3. $\text{CH}_3\text{CO}_2\text{H}$
4. CH_3NH_2

Correct Answer: 1.

Comments to the instructor: Hexane, $\text{CH}_3\text{CH}_2\text{CH}_2\text{CH}_2\text{CH}_2\text{CH}_3$, is a hydrocarbon, and nonpolar. Water is polar. Using the axiom, "like dissolves like", hexane would water-insoluble. CH_3OH , $\text{CH}_3\text{CO}_2\text{H}$ and CH_3NH_2 are polar and can participate in hydrogen-bonding interactions with water, which would make these compounds quite water-soluble.

Consider a gas mixture of N_2 and CO_2 , in which case is the CO_2 most soluble?

1. $P_{\text{T}} = 1.0 \text{ atm}$; $P_{\text{CO}_2} = 0.5 \text{ atm}$
2. $P_{\text{T}} = 4.0 \text{ atm}$; $P_{\text{CO}_2} = 0.8 \text{ atm}$
3. $P_{\text{T}} = 3.0 \text{ atm}$; $P_{\text{CO}_2} = 1.5 \text{ atm}$
4. $P_{\text{T}} = 2.0 \text{ atm}$; $P_{\text{CO}_2} = 0.5 \text{ atm}$

Correct Answer: 2.

Comments to the instructor: Get students to think about a bottle of carbonated beverage. The greater the external pressure (relative to the solution), the greater the solubility of gas.