

**13 • IMFs, Liquids, & Solids****PRACTICE FRQ**

Use the information in the table below to respond to the statements and questions that follow. Your answers should be in terms of principles of molecular structure and intermolecular forces.

Compound	Formula	Lewis Electron-Dot Diagram
Ethanethiol	$\text{CH}_3\text{CH}_2\text{SH}$	$\begin{array}{c} \text{H} \quad \text{H} \\ \text{H}:\ddot{\text{C}}:\ddot{\text{C}}:\ddot{\text{S}}:\text{H} \\ \text{H} \quad \text{H} \end{array}$
Ethane	$\text{CH}_3\text{CH}_3$	$\begin{array}{c} \text{H} \quad \text{H} \\ \text{H}:\ddot{\text{C}}:\ddot{\text{C}}:\text{H} \\ \text{H} \quad \text{H} \end{array}$
Ethanol	$\text{CH}_3\text{CH}_2\text{OH}$	$\begin{array}{c} \text{H} \quad \text{H} \\ \text{H}:\ddot{\text{C}}:\ddot{\text{C}}:\ddot{\text{O}}:\text{H} \\ \text{H} \quad \text{H} \end{array}$

- (a) List the type of intermolecular force associated with each of the above compounds.
- (b) Energy is required to boil ethanol. Consider the statement “As ethanol boils, energy goes into breaking C–C bonds, C–H bonds, and O–H bonds.” Is the statement true or false? Justify your answer.
- (c) Ethanol is completely soluble in water, whereas ethanethiol has limited solubility in water. Account for the difference in solubilities between the two compounds in terms of intermolecular forces.