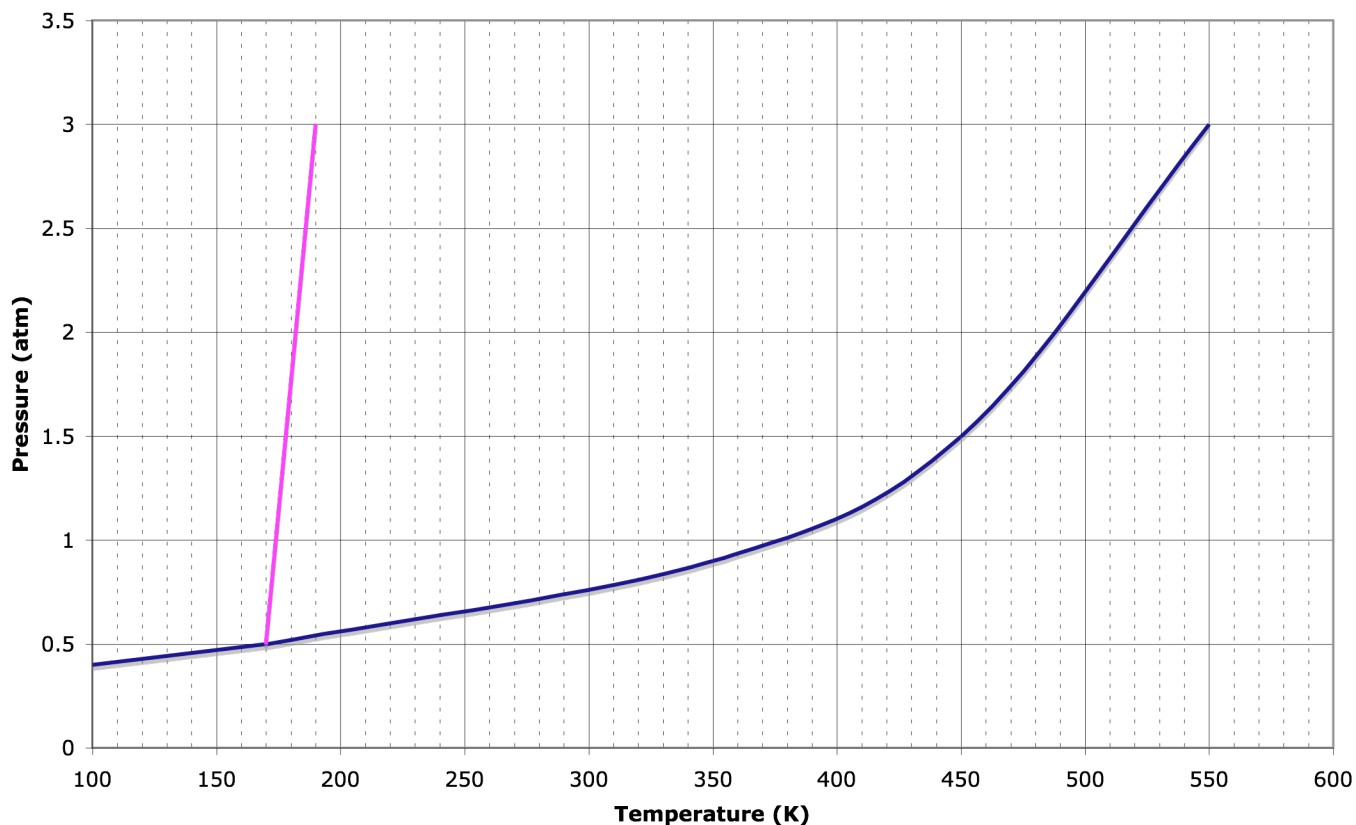


Figure 3. One Component SLV Phase Diagram



Refer to the solid-liquid-gas phase diagram above. [0°C = 273 K ; 1 atm = 760 torr]

What temperature is the normal boiling point of this substance?

What temperature is the normal melting point of this substance?

What state does this substance exist in at 25°C and 1 atm?

What is the equilibrium vapor pressure of this substance at 300 K?

### Clausius-Clapeyron Equation for Vapor Pressure (VP)

The normal boiling point of methanol is 64.6°C. Calculate the vapor pressure of methanol at 25.0°C.

$R = 8.314 \times 10^{-3} \text{ kJ/mole}\cdot\text{K}$        $0.0^\circ\text{C} = 273.2 \text{ K}$

methanol       $\Delta H^\circ_{\text{vapor}} = 34.5 \text{ kJ/mol}$

### Enthalpy of Phase Changes

$$q_{\text{phase change}} = \Delta H_{\text{phase change}} \cdot \text{moles}$$

Calculate the heat for melting 454 g of copper metal at its normal melting point.

$\Delta H^\circ_{\text{fusion}} = 13.3 \text{ kJ/mol}$  for copper.

Calculate the heat for vaporizing 100.0 g of liquid methanol at its normal boiling point.

$\Delta H^\circ_{\text{vapor}} = 34.5 \text{ kJ/mol}$