

CH365 CHEMICAL ENGINEERING THERMODYNAMICS

Lesson 10: P-V-T Behavior of Pure Gases

Read: Sections 3.1 and 3.2, pp. 68-77

Problems: 3.1, 3.4, 3.6, 3.9

Objectives:

1. For mathematical functions of more than one variable, be able to write the total differential from the partial derivatives.
2. For the molar volume $V=V(T,P)$, be able to write the total differential in terms of the partial derivatives.
3. Be able to qualitatively describe the P-V-T behavior of pure gases using P-T and P-V diagrams.
4. Describe the behavior of a vapor-liquid system between the triple point and the critical point.
5. Explain how the improved equations of state account for non-ideal behavior near the critical point.

Definitions:

intensive variable
extensive variable
total differential
triple point

critical point
volume expansivity (κ)
isothermal compressibility (β)
isothermal compressibility (β)

sublimation curve
vaporization curve
fusion curve

Notes: