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 its total differential from its partial derivatives.

2. For the molar volume V=V(T,P), be able to write the total differential in terms of partial derivatives.

3. Be able to qualitatively describe the P-V-T behavior of pure gases using P-T and P-V diagrams.

4. Understand how to describe the behavior of a vapor-liquid system as it approaches 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 of a function:

Triple point:

Critical point:

Volume expansivity (κ):

Isothermal compressibility (β):

Sublimation curve:

Vaporization curve:

Fusion curve:

Notes: