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. Be able to write the total differential in terms of partial derivatives for mathematical functions of more than one variable.

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

3. Be able to describe the P-V-T behavior of pure gases in a qualitative sense and 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: