

Supercritical Fluid Chromatography

- 1. What is supercritical fluid**
- 2. Supercritical Fluid Extraction**
- 3. Supercritical fluid chromatography (SFC)**
- 4. Theory of SFC**
- 5. Instrumentation**
- 6. Applications**

Supercritical Fluid Chromatography

1. What is supercritical fluid

Supercritical fluid is a state of matter that is intermediate between a gas and liquid in its properties. This state formed when a gas or liquid solvent is subjected to temperature and pressure condition exceeding a particular critical point. The temperature and pressure at which this point occurs are known as the critical temperature and critical pressure and are characteristic of the solvent. Beyond this point, the solvent will be neither a gas or liquid, but will possess properties of both phases. Whether this supercritical fluid acts more like a gas or liquid will depend on the pressure and temperature

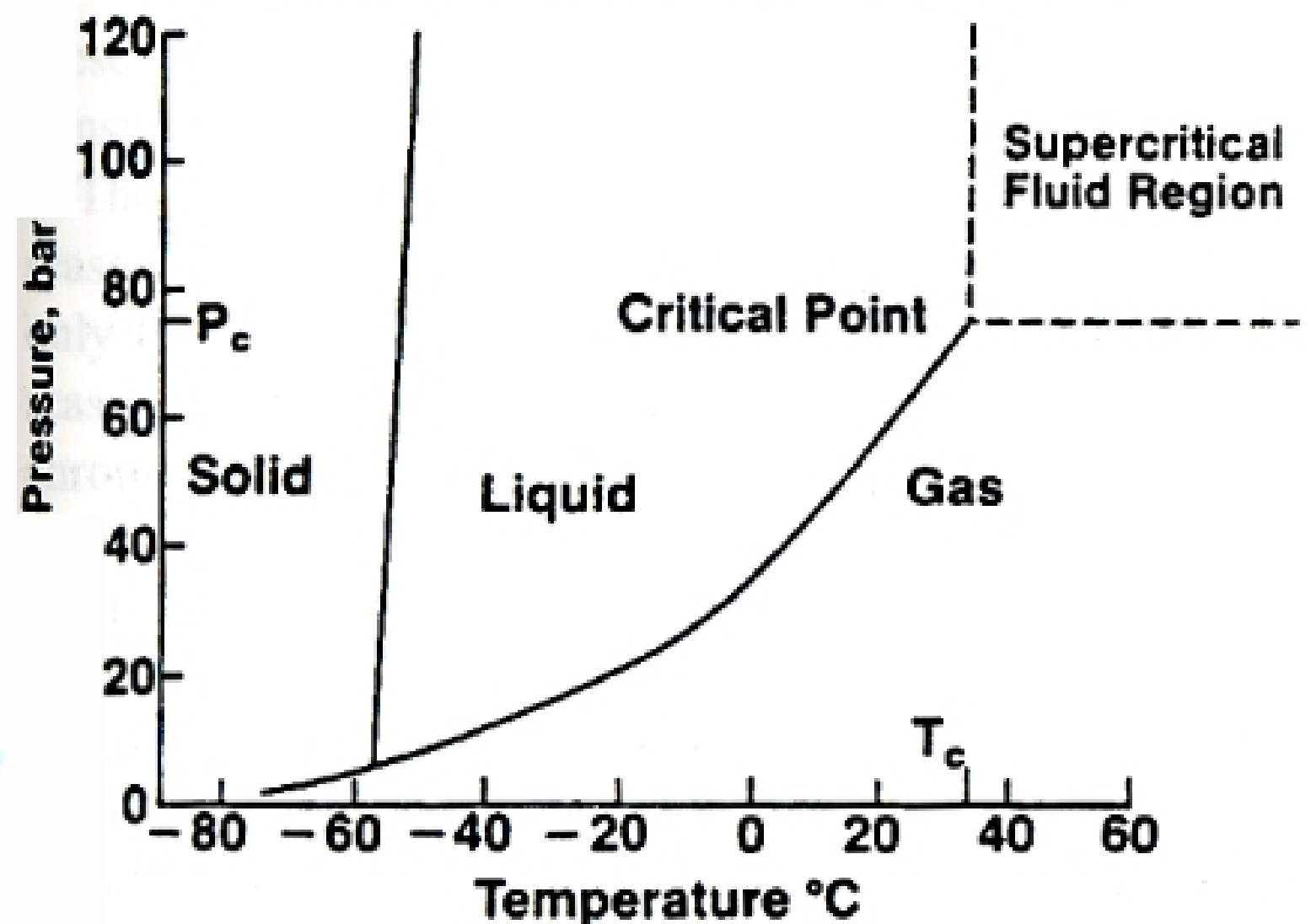


Figure 7.1. Phase diagram for carbon dioxide

Table 7.1

Change in density of supercritical fluid carbon dioxide with pressure and temperature

Temperature (°C)	Pressure (atm)	Density (g/ml)
40	72	0.22
	400	0.96
60	72	0.17
	400	0.90
80	72	0.14
	400	0.82
100	72	0.13
	400	0.76
120	72	0.12
	400	0.70
140	72	0.11
	400	0.64

Table 7.2

Representative properties of typical chromatographic mobile phases

Mobile phase	Temperature (°C)	Pressure (atm)	Density (g/ml)	Diffusivity (cm ² /s)	Viscosity (cP)
Helium	200	1.5	2×10^{-4}	0.1-1	0.02
Carbon dioxide					
low density	100	80	0.15	10^{-3}	0.02
high density	35	200	0.8	10^{-4}	0.1
Water	20		1.0	10^{-5}	1.0