

## Thermodynamic processes:

Process in which state of thermodynamic variables like  $P, V, T$  changes are called thermodynamic processes.

Given fixed number of moles / closed system ( $n = \text{constant}$ ) under ideal conditions is assumed ( $PV = nRT$  is applicable)

Constant volume process / Isochoric process / Isometric process:

Gas is confined in a piston cylinder arrangement having fixed piston.

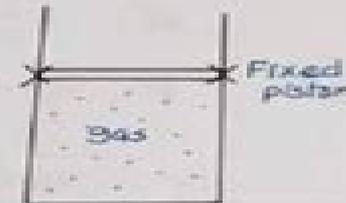
$$V = \text{constant}$$

$$PV = nRT \Rightarrow \frac{P}{T} = \left(\frac{nR}{V}\right) = \text{const.}$$

Process equation:  $\frac{P}{T} = \text{constant}$

Between two states  $(P_1, V, T_1)$  and  $(P_2, V, T_2)$

$$\text{one can use: } \frac{P_1}{T_1} = \frac{P_2}{T_2} \quad \left\{ T_1, T_2 \text{ must be in kelvin} \right\}$$



Example: A given mass of an ideal gas is confined in a vessel of fixed volume. At  $27^\circ\text{C}$  pressure of the gas is found to be  $2.4 \text{ atm}$ . Find its pressure if the gas is heated to  $52^\circ\text{C}$ .

$$\begin{aligned} \text{Sol: } P_1 &= 2.4 \text{ atm} & , & \quad T_1 = 273 + 27 = 300 \text{ K} \\ P_2 &= ? & , & \quad T_2 = 273 + 52 = 325 \text{ K} \\ \frac{P_1}{T_1} &= \frac{P_2}{T_2} \Rightarrow P_2 = \frac{T_2}{T_1} \times P_1 = \frac{325}{300} \times 2.4 = 2.6 \text{ atm} \\ & & & \quad \text{(answer)} \end{aligned}$$

# Chemical Engineering Lecture Notes

**Victor M. Corman**



## **Chemical Engineering Lecture Notes:**

**Inleiding chemie en chemische technologie** J.A.M. Kuipers,2016      **Lecture Notes for Chemical Students** Edward Frankland,2023-07-18 This classic textbook first published in the mid 19th century remains a valuable resource for students of chemistry and chemical engineering The book provides clear concise explanations of key principles and concepts in chemistry along with numerous examples and exercises to help students master the material This work has been selected by scholars as being culturally important and is part of the knowledge base of civilization as we know it This work is in the public domain in the United States of America and possibly other nations Within the United States you may freely copy and distribute this work as no entity individual or corporate has a copyright on the body of the work Scholars believe and we concur that this work is important enough to be preserved reproduced and made generally available to the public We appreciate your support of the preservation process and thank you for being an important part of keeping this knowledge alive and relevant      *Introduction to Fusion Power* Robert G. Mills,1977      **Lecture Notes in Chemical Engineering Kinetics and Chemical Reactor Design** Alex De Visscher,2013-12-12 Chemical Engineering Kinetics and Reactor Design is one of the key courses in any academic Chemical Engineering studies and it is typically offered in the third year of a Chemical Engineering undergraduate program The main objective of this course is to learn to analyze the performance of chemical reactors and to design them This book covers all topics that are taught in an undergraduate course on Chemical Engineering Kinetics and Reactor Design Starting from the study of chemical kinetics of homogeneous noncatalytic systems the book moves on to heterogeneous catalytic kinetics enzymatic kinetics and other complex systems Armed with this knowledge the student is taught how to describe batch reactors continuous stirred tank reactors and plug flow reactors The book is concluded with a chapter on the determination of reaction kinetics from experimental data and a chapter introducing advanced reactor design While analytical solutions to reactor problems are discussed whenever they are relevant the main focus is on numerical reactor models All models are freely available either as Matlab code or as an Excel file on the series website that can be found at <http://www.lecturenotesonline.com>      *Chemical & Metallurgical Engineering* Eugene Franz Roeber,Howard Coon Parmelee,1921      *The PDCA Cycle for Industrial Improvement* Arturo Realyvásquez Vargas,Jorge Luis García Alcaraz,Suchismita Satapathy,José Roberto Díaz-Reza,2023-03-27 This book provides a conceptual description of the PDCA cycle and the tools that support it A brief literature review is given for each tool indicating the timeline according to Scopus the main areas in which they are applied the main authors and the journals that most publish on these topics It reports three industrial applications one focusing on cost reduction the second on optimizing a manufacturing company's raw material receiving process and the third one on eliminating waste and increasing performance      *General Information* ,1911      *Chemical Engineering Education* ,2002      *Chemical Literature and Its Use* Marion Emeline Sparks,1919      *Catalog* South Dakota School of Mines and Technology,1927      *Process Design Pocket Reference Guide* A. I. Biaglow,2008-01-15

Notes and methods useful for chemical engineering students in process design      **Chemical Literature and Its Use**  
Marion Emeline Sparks,2016-09-14 Excerpt from Chemical Literature and Its Use Notes of a Course of Lectures in Chemistry  
92 Required of Third Year Students in Chemistry and Chemical Engineering University of Illinois These notes were compiled  
to serve as a brief guide to the increasing flood of chemical literature They are prepared for the use of students who have a  
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successfully any imperfections that remain are intentionally left to preserve the state of such historical works      **Statistical**  
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handbook and ready reference presents a combination of statistical information theoretic and data analysis methods to meet  
the challenge of designing empirical models involving molecular descriptors within bioinformatics The topics range from  
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