

## CH 204: Chemical Reaction Engineering

### References

#### Books

- 1 Carberry J.A., Chemical and Catalytic Reaction Engineering, McGraw Hill 1976.
- 2 Denbigh K., The Principles of Chemical Equilibrium, Cambridge Press 1971
- 3 Fogler, H. S., Elements of Chemical Reaction Engineering, Prentice Hall of India, 1994.
- 4 Fromment G.F. and Bischoff K.B., Chemical Reactor Analysis and Design, John Wiley 1994.
- 5 Hill C.G., An Introduction to Chemical Engineering Kinetics and Reactor Design, John Wiley 1977.
- 6 Lapidus L. and Amudson N. R. (Eds.), Chemical Reactor Theory - A Review, Prentice Hall 1977
- 7 Levenspiel O., Chemical Reaction Engineering, Wiley Eastern 1972
- 8 Levenspiel O., The Chemical Reactor Omnibook, OSU 1989
- 9 Prausnitz, J. M., "Molecular thermodynamics of fluid phase equilibria", Prentice-Hall (1969).
- 10 Smith J.M., Chemical Engineering Kinetics, McGraw-Hill 1974.
- 11 Holub, R. and Vonka, P., The chemical equilibrium of gaseous systems, D Reidel 1976.
- 12 Laidler, K. J., Chemical Kinetics, Tata McGraw Hill 1965.
- 13 Kyle, B. G. Chemical and Process Thermodynamics, Prentice-Hall 1984.
- 14 Flory PJ, Principles of polymer chemistry, Cornell U, Ithaca, NY 1953.
- 15 Peebles, LH, Molecular weight distributions of polymers, Wiley, New York, 1971.
- 16 Doraiswamy LK and Sharma MM, Heterogeneous reactions, Analysis, Examples and Reactor Design, Vol I & II., John Wiley, New York, 1984.
- 17 Anderson, JR, and Boudart M. Eds., Catalysis: Science and Technology, Springer-Verlag, 1987
- 18 Gregg SJ and Sing KSW, Adsorption, Surface Area and porosity, Academic Press, NY 1967.
- 19 Bird RB, Stewart WE & Lightfoot FN, Transport phenomena, John Wiley (1960).
- 20 Gregg SJ & Sing KSW, Adsorption, surface area and porosity, Academic press, 1967.
- 21 Satterfield CN, Mass transfer in heterogeneous catalyst, MIT press, 1970,
- 22 Aris R., The mathematical theory of diffusion and reaction in permeable catalyst Vol I&II, Oxford U press, 1975.
- 23 Astarita G, Mass transfer with chemical reaction, Elsevier, Amsterdam, 1967.
- 24 Davidson JF and Harrison D., Fluidization, Academic Press, New York, 1971.
- 25 Rase HF, Chemical Reactor Design for process plants, Vol I&II, Wiley, 1977.
- 26 Rose LM, Chemical Reactor design in practise, Elsevier, 1981.
- 27 Homogeneous catalysis: mechanisms & industrial applications Volumes 1-3, S. Bhaduri, D. Mukesh, Wiley-VCH, 2000
- 28 Industrial catalysis, optimising of catalysts and processes R.I. Wijngaarden, K.R. Westerterp, A. Kronberg, Wiley-VCH, 1998
- 29 Handbook of heterogeneous catalysis' Volumes 1-5, G. Ertl, H. Knözinger, J. Weitkamp, Wiley-VCH, 1997

#### Kinetics

- 30 Arrenhius S., Z. Physik Chem, 4, 226, 1889. – Arrenhius rate law

- 31 Trautz Z, Anorg Chem, 96, 1, 1916. – collision theory  
32 Lewis, W.C., J. Chem. Soc, 113, 471, 1918 – collision theory  
33 Eyring H., J. Chem. Phys., 3, 107, 1935. – transition state theory  
34 Lindemann, F. A., Trans. Faraday Soc., 17, 589, 1922. – unimolecular reaction as complex  
35 Bodenstein, M. and Lind, SC, Z. Physik Chem., 57, 168, 1907. quasi-steady state approx.  
36 Ray, WH, Macromolecular Sci. Rev., Macromol Chem., C8, 1972. Polymerization  
reaction review.  
37 Rice, F. O., and Herzfeld KF, J. Am. Chem. Soc., 56, 284 1944. – pyrolysis/thermal  
cracking mechanisms.  
38 Toulman, Phy. Rev., 23, 699, 1924. Principle of microscopic reversibility.  
39 Michaelis, L and Menten ML, Biochem. Z., 49, 339, 1913. MM kinetics for enzymes  
40 Langmuir I, J. Am. Chem. Soc. , 38, 2221, 1916. Langmuir adsorption  
41 Weisz PB, Adv. In catalysis, 13, 137, 1962. – bifunctional catalysis.  
42 Boudart M. and Djega-Mariadassou, Kinetics of heterogenous catalytic reactions,  
Princeton U, 1984.  
43 Yang KH and Hougou, OA, Chem. Eng. Prog., 46, 146, 1950. Generalized tables for  
catalytic reaction kinetics.  
44 Wei J. and Pratter CD, Adv. Catalysis, 13, 1962. Complex reaction network analysis.  
45 Wei J and Kuo JCW, Ind. Eng. Chem. Funda., 8, 114, 124, 1969. – lumping analysis.  
46 Ramage et al., Adv. In Chem. Engg., 13, 193, 1987. Lumping analysis.  
47 Coxson PG and Bischoff KB, Ind. Eng. Chem. Res., 26, 1239, 2151, 1987. Lumping  
analysis.

### Transport processes and kinetics

- 48 Mason EA, Mallinauskas A and Evans RB, J. Chem. Phy, 46, 3199, 1967.  
Multicomponent diffusion  
49 Schneider P, Chem. Engg. Sci., 33, 1311, 1978.  
50 Feng CF & Stewart WE, Ind. Eng. Chem. Funda., 12, 143, 1973. Parallel-cross linked pore  
model  
51 Wakao N & Simth JM, Chem. Engg. Sci., 17, 825, 1962. random pore model  
52 Thiele EW, Ind. Eng. Chem., 31, 916, 1939. Thiele modulus  
53 Weisz PB & Hicks JS, Chem. Eng. Sci., 17, 265, 1962. Nonisothermal pellet reaction  
54 Weisz PB & Pratter CD, Adv. Catalysis, 6, 143, 1954. Criteria for diffusional limitations  
55 Kovos RM & Nowak EJ, Chem. Eng. Sci., 22, 470, 1967. – criteria for diffusional  
limitations  
56 Kehoe JPG & Butt JB, AIChE J., 18, 347, 1972. Interaction of external and internal  
diffusion resistances.  
57 Dorr DW & Aris R, Chem. Eng. Sci., 24, 541, 1969. Multiplicity criteria for  
nonisothermal catalyst  
58 Wen CY, Ind. Eng. Chem., 60, 34, 1968. Gas solid noncatalytic reactions  
59 Sohn HY & Szekely J, Chem Eng Sci, 27, 763, 1972. grain model for GS noncatalytic  
reactions  
60 Weisz PB & Goodwin RD, J. Catalysis, 2, 397, 1963 Gas solid noncatalytic reactions  
61 Lewis WK and Whitman WG, Ind. Eng. Chem., 16, 1215, 1924. –two film theory  
62 Danckwerts PV, Ind. Eng. Chem., 43, 1460, 1951. – penetration theory

### Reactor Design

- 63 Aris, R. I & EC , 56, 22, 1964. – overview of chemical reactor design.

- 64 Aris R., *Mathl. Comput. Modelling*, 18, 95, 1993. – general aspects of modeling  
65 Aris R., *Mathl. Modelling*, 1, 1, 1993. – general aspects of modeling  
66 Aris R., *Appl. Math. Modelling*, 1, 386, 1993. – general aspects of modeling  
67 Van Deemter JJm=, *Chem Eng. Sci*, 13, 143, 1961. Fludized bed reactor model  
68 Kunii D and Levenspiel O, *Fludization Engineering*, Wiley, New York, 1969.  
69 Shah YT, *Gas-liquid-solid reactor design*, McGraw-Hill New York, 1979.  
70 Marroquin and Lubyen, *Chem Eng. Sci*, 28, 993, 1973. Optimal temperature profiles in batch reactor  
71 Jackson and Senior, *Chem Eng. Sci*, 23, 971, 1969, semi-batch reactor optimization  
72 Hashimoto K, Teramoto M, Nagata S. *J. Am. Oil Chem Soc*, 48, 291, 1971., *J. Chem. Engg. Japan*, 4, 150, 1971. – hydrogentation of vegetable oils  
73 Fair JR & Rase HF, *Chem Eng Prog*, 50, 415, 1954. Ethane cracking  
74 Plehiers PM and Fromment GF, *Oil & Gas J*, 41, 1987. Ethane cracking  
75 RaO MV, Plehiers PM and Fromment GF, *Chem Eng Sci*, 43, 1988. Ethane cracking  
76 Paynter JD, Dranoff JS & Bankoff SG, *Ind. Eng. Chem. Proc. Des. Dev.*, 10, 244, 1971. Adiabatic fixed bed reactor design  
77 Bilous O & Amudson NR, *AIChE J*, 2, 117, 1956. Hot spots in tubular reactor  
78 Van Welsenaere RJ & Fromment GF, *Chem Eng Sci*, 25, 1503, 1970. Hot spots in tubular reactor  
79 *Chem Eng Sci*, 35, 249, 1980, Hot spots in tubular reactor  
80 Baddour RF, Brian PL, Logeais BA, Emery JP, *Chem Eng Sci*, 20, 281, 1965. Autothermal reactors  
81 Vejtassa SA and Schimtz RA, *AIChE J*, 16, 416, 1970. Multiplicity in stirred tank reactor  
82 Perlmutter DD, *Stability of chemical reactors*, Prentice Hall, 1972.  
83 Herskowitz and Smith, *AICHE J*. 29(1), 1, 1983 – trickle bed reactor review  
84 Satterfield, *AICHE J*. 21(2), 209, 1983 – trickle bed reactor review  
85 Krishna, *Adv. Chem. Engg*, 19, 201, 19\*\* - multiphase reactor design  
86 Berty, *Applied Industrial Catalysis*, Vol I, 41, 1983 – laboratory reactors for catalytic reactors  
87 Epstein, *Scientific American*, 96, March 1983 – oscillating chemical reactors  
88 Kittrell, *Adv. Chem. Engg.*, 8, 97, 1970, modelling of chemical reactions  
89 Joshi et al, *AICHE J*, 37, 323, 1991, *ibid*, 40, 944, 1994 – gas liquid reactions  
90 Van Heerden, I & EC, 45, 1242, 1953 – autothermic processes  
91 Pereira, *Chem Eng Sci*, 54, 1959, 1999 – environmentally friendly processes  
92 Dudokovic et al., 54, 1975, 1999 – multiphase reactors  
93 Michelson and Villadson, 27, 751, 1972 – stability analysis for catalyst pellet  
94 Mark E. Davis, Graeme Fairweather and John Yamanis, *Chem. Eng. Sci*, 37, 442, 1982 Analysis of SO<sub>2</sub> oxidation in non-isothermal catalyst pellets using the dusty-gas model  
95 Villadsen, I &EC Research, 38, 660, 1999 Design of biodegradation process  
96 Zwietering, *Chem. Engg. Sci.*, 11, 1, 1959 – mixing in continuous flow  
97 Danckwerts, *Chem. Engg. Sci*, 2, 1, 1953, residence time distributions  
98 Irving, Butt, *Chem. Engg. Science*, 22, 1859, 1967. – intraparticle temperature gradients