Int. J. Multiphase Flow Vol. 9, No. 5, pp. 609-613, 1983 Pergamon/Elsevier Printed in Great Britain

ANNOUNCEMENTS

FLUIDIZED BED TECHNOLOGY

Stanford University, Department of Chemical Engineering, 8–12 August 1983

Fluidized bed technology continue to provide a focus for the attention of researchers, and to frustrate and thwart the engineer, in chemical and other industries. New data and information, ideas and hypotheses, facts and erroneous theories, continue to be produced.

The purpose of this course is to provide the practicing engineer with:

- An up-to-date condensed and critical view of the state of knowledge
- Highlights of salient points
- Sources of data and correlations
- Design philosophy and methods
- An outline of the outstanding areas of uncertainties

The course will consist of:

- A series of coordinated lectures by well known experts
- Lecture notes to be distributed prior to the course discussions
- Selected movies and slides to illustrate physical phenomena
- Excellent and convenient accommodations of the Stanford Campus
- Limited attendance

LECTURERS

G. M. Homsy Professor of Chemical Engineering, Stanford University.
G. Hetsroni Professor of Mechanical Engineering, Technion
T. Fitzgerald Senior Staff Process Engineer, TRW Inc.
J. M. Beer Professor of Chemical Engineering, M.I.T.
J. Stinger Program Manager, EPRI
J. F. Davidson Professor of Chemical Engineering, University of Cambridge
J. R. Grace Professor of Chemical Engineering, University of British Columbia

COURSE DIRECTOR

G. Hetsroni Visiting Scholar, Department of Chemical Engineering, Stanford, University, Stanford, CA 94305, U.S.A.
G. G. Fuller Professor of Chemical Engineering, Stanford University, Stanford, CA 94305, U.S.A.

Monday 8 August 1983

(1) *Fluidization fundamentals I* (G. M. Homsy). Basic phenomena and equations of fluidization, incipient fluidization, particle type classifications and properties, flow regimes, bed expansion.

(2) *Fluidization fundamentals II* (G. M. Homsy). Onset of bubbling, instability phenomena, two phase theory of fluidization, effect of temperature and pressure on behavior of fluidized beds.

(3) *Thermodynamics of phase change and combustion* (G. Hetsroni). Definition of phases, phase rule, thermodynamic states and properties of single and two-phase systems, critical point, vapor pressure, surface tension, spinodal line, thermodynamis of combustion.

(4) *Instrumentation of fluid bed combustion* (T. Fitzgerald). Introduction to measurements, intrusive and non-intrusive probes, average and local measurements, measurements of temperatures and heat transfer coefficients.

Tuesday 9 August 1983

(5) *Solids feeding* (T. Fitzgerald). Overbed vs underbed feeding, solids splitting, gravity feeding vs. hoppers, feeding of coal into gasifiers, various feeding devices and mechanisms, flow regulation and metering.

(6) *Fluid bed combustion of coal* (T. Fitzgerald). Application of fluid bed combustion of coal, design considerations, operational experiences and difficulties, limestone utilization.

(7) *Formation and emission* (J. M. Béer). Transformation of fuel bound nitrogen to NO_x and N_2 NO reducing reactions, a model of NO formation and destruction in the bed.

(8) *Particle clean up* (T. Fitzgerald). Fly ash generation; entrainment, clean up devices, filters, cyclones, optimal design of cyclones, efficiency.

Wednesday, 10 August 1983

(9) *Freeboard reactions* (J. M. Béer). Entrainment of solid particles from the bed into freeboard, reduction of NO by solid carbon and CO, oxidation of carbon monoxide and of hydrocarbons, with special reference to polycyclic aromatic hydrocarbons.

(10) *Advanced cycles* (J. M. Béer). Advanced cycles for power generation, cogeneration, combined cycles.

(11) *Corrosion* (J. Stringer). Chemistry of corrosion, corrosion in fluidized beds, effect of combustion on corrosion, compatibility of materials, erosion in fluidized beds and in gas turbine expanders, design principles.

Thursday 11 August 1983

(12) *Coal gasification* (J. Stringer). Winkler gasifier, merits and problems, postwar developements in gasification; three stage gasifiers, moving-burden processes, agglomeration processes; Exxon, CAFB and other processes; operational aspects.

(13) *History of fluidized bed combustion* (J. F. Davidson). Overview, advantages and disadvantages of various methods.

(14) *Single particle combustion* (J. F. Davidson). Chemical aspects of combustion, kinetics of single particle combustion, models and computation of combustion, practical aspects.

(15) *Pressurized and circulating fluid bed* (J. R. Grace). Combustion in pressurized beds-design considerations, operating experience; combustion in circulating fluid bed-design considerations and operating experience.

Friday 12 August 1983

(16) *Heat transfer* (J. R. Grace). Gas–solid heat transfer, bed to surface heat transfer, packet theory, large particle heat transfer, correlations, effect of various parameters.

(17) *Combustion of fuels other than coal.* (J. R. Grace). Waste incineration, combustion of biomass, (e.g. wood, wastes, rice husks, hay) liquid incineration, gases, washing rejects.

(18) *Design* (J. F. Davidson). Overall design objectives and various design aspects; grid design, optimal bed dimensions, solid feeding, tube bundle.

Reservations

Please return by 1 July 1983

The course fee, including room and board, is $1,100 per registrant. Accommodations will be made on campus at one of Stanford's student residences (w/o private baths). Three meals per day will be provided. ☐

The course fee EXCLUSIVE of room and board is $800. I will be planning my own accommodations. ☐

Course Fee Includes Printed Lectures

Please make checks payable to Stanford University. Detach and mail to:

Department of Chemical Engineering
Stanford University
Stanford, CA 94305, U.S.A.

Name ______________________

Affiliation ______________________

Address ______________________

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Phone: ______________________