Curriculum Vitae

Ajitkumar Sudhakar Gudekar

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Academic Qualifications

Ph. D. (Tech.) in Chemical Engineering (2009)

Chemical Engineering Department, Institute of Chemical Technology, Mumbai, India.

Thesis : Optimization of Concentrating Type Solar Collector and other Thermal Systems
Research Guide: Professor A. B. Pandit

Master of Chemical Engineering (2002)
Chemical Engineering Department, Institute of Chemical Technology, Mumbai, India.

Thesis : Engineering Aspects of Manufacturing Non-cyclic Esters of Phosphoric Acid
Research Guide: Professor B. N. Thorat

B.E. (Chemical) (2000)
D. J. Sanghvi College of Engineering, Vile Parle, Mumbai, India.

Project : Manufacturing of 1000 TPA Adipic Acid

Professional Qualification

BEE (Bureau of Energy Efficiency, Govt. of India) certified **Energy Auditor.**

Publications

1. **A. S. Gudekar**, A. S. Jadhav, S. V. Panse, J. B. Joshi and A.B. Pandit. 'Cost Effective Design of Compound Parabolic Collector for Steam Generation'. **Solar Energy**, Vol. 90 (2013) pp 43–50.

2. A. S. Jadhav, **A. S. Gudekar,** R. G. Patil, D. M. Kale, S. V. Panse and J. B. Joshi, 'Performance analysis of Novel and Cost Effective Compound Parabolic Collector'. **Energy Conversion and Management**, Vol. 66. (2013) pp 56-65.

3. S. V. Panse, A. S. Jadhav, **A. S. Gudekar** and J B Joshi, 'Inclined Solar Chimney for Power Production'. **Energy Conversion and Management,** Vol. 52 (2011) pp. 3096-3102.

4. A. A. Ganguli, **A. S. Gudekar**, A. B. Pandit and J. B. Joshi, 'A Procedure to Improve the Energy Efficiency of a Cooking Device via Thermal Insulation'. *The Canadian Journal of Chemical Engineering*, Vol. 90 (2012) pp. 1212–1223.

5. J. B. Joshi, A. B. Pandit, S. B. Patel, R. S. Singhal, G. K. Bhide, K. V. Mariwala, B. A. Devidayal, S. P. Danao, **A. S. Gudekar**, and Y. H. Shinde, 'Development of Efficient Designs of Cooking Systems - I :Experimental'. *Ind. Eng. Chem. Res.*, 2012, *51* (4), pp 1878–1896.

6. J. B. Joshi, A. B. Pandit, S. B. Patel, R. S. Singhal, G. K. Bhide, K. V. Mariwala, B. A. Devidayal, S. P. Danao, A. A. Ganguli, **A. S. Gudekar**, P. V. Chavan, and Y. H. Shinde, 'Development of Efficient Designs of Cooking Systems - II : Computational Fluid Dynamics and Optimisation'. *Ind. Eng. Chem. Res.*, 2012, *51* (4), pp 1897–1922.

7. R. S. Singhal, A. B. Pandit, J. B. Joshi, S. B. Patel, S. P. Danao, Y. H. Shinde, **A. S. Gudekar**, N. P. Bineesh, and K. M. Tarade, 'Development of Efficient Designs of Cooking Systems–III: Kinetics of Cooking and Quality of Cooked Food Including Nutrients, Anti-nutrients, Taste and Flavour. *Ind. Eng. Chem. Res.*, 2012, *51* (4), pp 1923–1937.

Paper Presentations

1. A. S. Gudekar, S. S. Waje, B. N. Thorat and A. Mehta: 'Engineering Aspects of Manufacturing Tri n-Butyl Phosphate Ester', at 'ISCRE-18' (International Symposium in Chemical Reaction Engineering), Chicago, US, June 2004.

2. A. S. Gudekar, A. S. Jadhav, S. V. Panse and J. B. Joshi: 'Compound Parabolic Solar Collector for Process Heat', at 'International Conference on Solar Process Heat (World Sustainable Energy Days 2011)', Wels, Austria, March, 2011.

Technology Implementation/ Recognition

1. First prize for CPC based Solar steam generation system at KAIF-2009 (Knowledge and Innovation Fair), National level competition organized by TATA Power, Mumbai.

2. Technology for energy efficient cooking device, Eco-cooker, is licensed after successful R&D and extensive demonstration to 'ECOSENSE Appliances Pvt. Ltd.' (Aurangabad, Maharashtra) and product is now commercially available.

Professional Skills/ Experience

Solar thermal system design, commissioning and testing
R&D, Pilot scale studies
Reaction kinetics studies, Chemical engineering
System analyses using CFD
Feasibility studies, Technology demonstration, dissipation
Energy audit

Computer Skills

1. MS Windows, MS Office
2. CFD : ANSYS Workbench for Fluid flow and Heat Transfer analysis

Work Experience

1. Presently working as Post-Doctoral Research Associate at '**Institute of Chemical Technology**', **(formerly UDCT)**, Matunga, Mumbai
   - Solar Energy- High temperature concentrator development, Concentrated PV
   - Energy conservation in Cooking

2. '**Waaree Energies Pvt. Ltd.',** Mumbai as Sr. Manager- Solar Applications (Sep. 2012 to Nov. 2013)
   - Solar desalination
   - Solar air conditioning
   - Solar heating applications

3. '**Gadhia Solar Energy Systems P. Ltd. (Flareum Technologies)**', Valsad, Gujarat as Manager- R&D (Feb. 2012 to Sep. 2012).
   - High temperature solar thermo-chemical reactor- Reflector and receiver development and testing
   - Performance evaluation of Solar steam generation system (Scheffler dish)
   - Solar thermal system configurations for steam/hot water, air conditioning, cold storage
   - Development of solar dryer: agro-products, clay
   - Solar energy based cooking system development

4. '**Institute of Chemical Technology',** Matunga, Mumbai as '**Post-Doctoral Research Associate**' (July 2009 to Feb. 2012)
   - Solar energy: Solar energy based steam generation systems and Solar dryers
   - Energy Conservation: R&D and commercialization of energy efficient cooking devices
   - Design and development of large scale energy efficient continuous cooking systems
   - Design and development of biomass based energy efficient cooking stove

5. **'Laxmi Organic Industries Limited'**, (MIDC Mahad, Maharashtra), as Project Engineer (July 2002 – March 2004).
   - Recovery of Acetic acid from vent gases: Loss Quantification, Pilot Plant Setup & Study; Acid recovery in the form of Sodium acetate & Purification
   - Recovery of Acetic acid from aqueous waste stream
   - Dilute Acid Up-gradation: Separation of formic acid using Ion Exchange Resins

Personal Details

Date of Birth : 7th June, 1978
Languages : English, Marathi, Hindi
Marital Status : Married

References

Professor A. B. Pandit
Chem. Engg. Dept.
ICT, Matunga (E),
Mumbai - 19. India
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Email: dr.pandit@gmail.com

Professor J. B. Joshi
Homi Bhabha Distinguished Chair Prof.
Homi-Bhabha National Institute,
Anushaktinagar, Mumbai- 94.
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Salient features of Doctoral Research work

Research Topic: Optimization of Concentrating Type Solar Collector and other Thermal Systems

A. Steam Generation using Solar Energy

Major portion of industrial heat requirement falls in the medium temperature range. CPC systems (Compound Parabolic Collector) systems having advantage of no or minimal tracking can be used for this purpose. Various designs of CPC were fabricated and tested for thermal efficiency with water as a heat transfer fluid. A final system having 100 m^2 aperture area was designed, fabricated and tested successfully for steam generation up to temperatures of 120 ^oC. System performance was analyzed for energy loss using measurements and also by CFD. The steam generated using this CPC system was used for applications like Ammonia Absorption Refrigeration, Continuous Cooking of rice. A PTC system of 5 m^2 aperture was also fabricated and tested for comparative study. It was possible to reduce the cost for steam generation (by using CPC system) substantially, compared to PTC.

B. Scheffler Dish Standardization

Scheffler dish is used as a solar concentrating device for steam generation at low temperatures especially for cooking. A procedure was developed to find out the optical efficiency of the concentrator at the focal point (by flux mapping). This involved a ray tracing technique for various parts of the dish. Correcting measures for the system were applied to improve the thermal efficiency after secondary reflector. This dish was used to provide the energy required for cooking of food items in energy efficient cooking device, Ecocooker.

C. Inclined Solar Chimney for Power/ Drying Applications

The existing concept of solar chimney has concerns about stability and economic viability of the chimney and it also demands sophisticated engineering techniques for constructing a tall chimney. Various geometries of 'Inclined Solar Chimney' (ISC) were studied in lab and in actual solar conditions for testing air temperature and velocity. In this concept, chimney and the collector get merged. This makes the structure stable, cost effective and easy for construction. A mathematical model was developed considering the total energy balance. With some design modifications, the ISC set-up can be used for drying of various agricultural/food products for domestic/commercial applications.

D. Development of Energy Efficient cooking device- Ecocooker

Ecocooker is a device, developed for efficient cooking using simple principles to save energy. Performance of eco-cooker was further enhanced by introducing flue gases between two covers of eco-cooker and optimizing various parameters like heat flux and distance between burner and base**.** Energy loss from the various parts (burner flue gases, convective losses to surroundings) was studied. Optimum gap between two covers using air as insulation was determined applying CFD and was implemented in the design. After incorporating changes, new design for existing capacity cooker was suggested, tested exhaustively and implemented. Various capacity models ranging from domestic (3.5/ 5 lit) to Community scale (120 lit) were designed. Technology was demonstrated at many places in the state of Maharashtra, India (Schools, College Mess, Ashrams & Anandwan) and is in use with fuel savings in the range of 60 %. This technology is now under commercial development by a company (EcoSense Appliances Pvt. Ltd., Maharashtra) with license from Institute of Chemical Technology (Matunga, Mumbai) and Land Research Institute (Fort, Mumbai).

E. Large Scale Cooking

Large scale cooking is used at many locations like community places, government mid-day meal schemes and food programs run by charitable institutions. Batch cooking processes have limitations in handling large food quantities. Hence, most promising option in such cases is of continuous cooking. Continuous cooking system of 20 kg/hr capacity was developed for cooking of rice, dal with horizontal jacketed screw design. Scaled up version of 300 kg/hr capacity is now being commercialized.