MANOJ K. CHOUDHARY, Sc.D., P.E.

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MATERIALS SCIENCE & ENGINEERING EDUCATOR, SUSTAINABLE PROCESS AND PRODUCT INNOVATOR, LEADER OF PROFESSIONAL ORGANIZATIONS

Materials scientist and engineer with 4 decades of experience in Process and Product Innovation, Sustainability, Leadership of Teams & Organizations, Strategic Planning, Teaching, and Mentoring.

Regarded as a leading international expert in application of scientific fundamentals, engineering analysis, and computational fluid dynamics for process and product innovation. Has experience with a wide range of manufacturing processes and products. These include glass and mineral melting and fiberizing, polymeric extrusion, and iron and steel making processes; and glass and mineral fiber insulation, and polymeric foams. Skilled in resolving process and product performance issues, and enhancing productivity, and sustainability. Excels in team work to drive process and product innovation. Leads teams and professional organizations to excellence through strategic planning, initiatives, coaching, mentoring, and proficient leveraging of resources. Teaches, trains and mentors colleagues and students.

EXPERTISE

Materials Thermodynamics / Process Kinetics/ Process Engineering & Modeling / Computational Fluid Dynamics / Glass Melting & Forming/ Materials Properties Simulation / Polymeric Foam Extrusion / Sustainable Processes & Products Development / Metallurgical Magneto-hydrodynamics / Team & Organization Leadership / Project Management / Teaching, Mentoring & Training

EDUCATION

- **Sc.D., Materials Science and Engineering**, **Massachusetts Institute of Technology**, Cambridge, MA (winner of **Falih N. Darmara Materials Achievement Award** from the Dept. of Mat. Sc. & Eng.)
- **M.S., Chemical Engineering**, **State University of New York**, Buffalo, NY
- **B.Tech. (Honors)**, **Chemical Engineering, Indian Institute of Technology**, Kharagpur, India (Winner of **Prof. S. K. Nandi Gold Medal** and **Institute Silver Medal**)

PROFESSIONAL EXPERIENCE

- **THE OHIO STATE UNIVERSITY,** Columbus, OH
  Adjunct Professor of Materials Science & Engineering, September 2018-Present

- **MKC INNOVATIONS, LLC,** Reynoldsburg, OH
  President, March 2018-Present

  Consultant on scientific /technical topics to glass /ceramic industry and professional organizations. Teach & train industry personnel on diverse topics including materials thermodynamics, transport phenomena, CFD, and process engineering. Strategic / Technical Advisors to companies including, during July 2018-December 2020, to **Glass Service**, a.s., Vsetin, Czech Republic.

- **OWENS CORNING SCIENCE & TECHNOLOGY,** Granville, OH
  Various positions elaborated below, September 1982 - March 2018

  Joined as an **Advanced Engineer**. Functioned in various capacities, e.g., as an **individual contributor**, **team member**, **project manager**, and **led several teams including Glass Furnace Statistical Process Control, Mathematical and Physical Modeling Laboratory, Glass Melting & Forming R&D**. Monitored technology developments, guided and trained colleagues and co-op students, represented Owens Corning in professional organizations, and collaborated with universities, national laboratories, and research institutions. Worked in Composites and Insulation Solutions Businesses in both process and product areas, and was a **scientific advisor to the senior level management**. Retired as a member of the **Senior Technical Staff**. **Received 9 awards, including 5 times, Owens Corning's highest technical achievement award**. Key accomplishments are listed below.

OWENS CORNING (OC) SCIENCE & TECHNOLOGY (continued)

- **Created and managed** the infrastructure for computational fluid dynamics (CFD) based simulation for glass melting, fiberglass and mineral wool insulation forming, and polystyrene foam extrusion processes.
- **Developed the first CFD software** in the world for the modeling of three-dimensional flow and heat transfer phenomena in glass furnaces and delivery channels. The CFD tools proved to be of great **competitive advantage** to Owens Corning for over 15 years before comparable tools became commercially available to the glass industry through various vendors.
- **Published pioneering approaches** on the mathematical modeling of electric melting of glass and the dissolution of silica grains in glass melts. The paper on electric melting received the **Best Paper Award** from the Industry Application Section of the IEEE.
- As a part of the Glass Technology group, the leader of the Modeling Laboratory and the leader of the Furnace Statistical Process Control team, **Proposed, evaluated, and implemented** furnace design, operation, and control innovations that, in combination with advances in raw materials, glass composition, and refractory materials over a period of 12 years, resulted in **3-fold increase in melting capability of furnaces; 40 to 50% decrease in specific melting energy requirement, and doubling of furnace life**.
- **Led and enabled** use of high-level of electrical energy (increasing electric energy from about 5% to 40% of total energy) in glass furnaces by inventing and implementing highly effective electrodes placement and electric firing circuits. Resulted in **significant capital cost reduction** by eliminating the need to install particulate emissions control devices and associated capital expenses.
- **Developed and implemented** melting technology for a boron-free glass composition, delivering up to **50% savings in raw materials cost and reducing particulate emissions**.
- As a part of a team on oxy-fuel melting of insulation glass**, proposed and implemented** design and operational strategies that solved production issues, led to 50%-60% increase in energy efficiency over the conventional air-fuel melting, and decreased capital expenses due to smaller combustion space.
- As the core member of a team, **developed a new polystyrene foam extrusion technology platform that eliminated ozone depleting blowing agents** (mandated by **Montreal Protocol**). A key innovation was the use of **nanographite**. The novel technology has allowed Owens Corning to remain key player in this high profile margins business. I was in charge of fundamental work and data generation related to solubility and rheology of polymeric melts containing blowing agents and nanographite, and, modeling of the extrusion die design. I also co-wrote a proposal that received **$1.8 million in funding** from the National Institute of Standards and Technology.
- **Developed and implemented** energy efficiency simulation methodology for commercial buildings; the approach has been adopted by the American Society of Heating, Refrigerating, and Air-conditioning Engineers (**ASHRAE**) to develop energy performance codes for commercial buildings.
- Authored more than **60 technical reports,** and received **10 patents** (9 of which are related to products, Owens Corning preferred not to file patents but keep as trade secrets innovations in glass furnace design and operation - my principal areas of professional engagement during 1982-2000).

ADDITIONAL EXPERIENCE

MASSACHUSETTS INSTITUTE OF TECHNOLOGY, Cambridge, MA
Post-doctoral Research Associate, June 1980- August 1982.

Conducted pioneering research on Metallurgical Magneto-hydrodynamics involving systems such as electroslag refining, plasma and electric arc furnaces, and resistance heated furnaces. Collaborated with researchers from the steel industry in US and from Japan and USSR.

Taught parts of graduate level course on “Transport Phenomena in Materials Processing” and supervised students.

Consulted for several companies on wide ranging topics pertaining to ferrous and non-ferrous metallurgy.

PROFESSIONAL ORGANIZATION LEADERSHIP EXPERIENCE

Led and have been a part of senior leadership of several important national and international professional organizations. In these roles, I have introduced and managed significant organizational innovations, including programs to attract and retain young professionals and promote to leadership positions, initiate and support international collaborations, encourage diversity acceptance, explore and enlarge financial resources, establish effective and improved communication strategies, and enhance industry/university/government collaborations.

- **Chair, North America Steering Committee for the United Nations International Year of Glass** (2021-2022)
- **Member of the Steering Committee of the International Commission on Glass** (2012-present)
- **President, the International Commission on Glass** (2015-2018) [Only the fifth American to hold this prestigious position in 87+-year old organization]
- **Director**, **the American Ceramic Society**, (2015 –2018)
- **Chair**, **Glass and Optical Materials Division**, American Ceramic Society (2001-2002)
- **President (and one of the founders)**, **Glass Manufacturing Industry Council** (1999)
- **Trustee**, **Glass Manufacturing Industry Council** (2000-2009)
- **Program Chair**, **18th International Congress on Glass**, the International Commission on Glass (1995-1998)
- **President** of the Industry Liaison Board**, NSF funded Industry-University Center for Glass Research, Alfred University (1995)**
- **Program Chair, Glass and Optical Materials Division,** American Ceramic Society (1994)

PROFESSIONAL HONORS AND AWARDS

- **Darshana and Arun Varshneya Frontiers of Glass Technology Lecture** (2023) from American Ceramic Society
- **Dr. Atma Ram Memorial Lecture** (2019) [The lecture is named in honor of Dr. Atma Ram, the founder director of the Central Glass and Ceramic Research Institute of India (CGCRI) in Kolkata, India and a pioneer in developing optical glass technology in India. This is the most prestigious lecture offered at CGCRI.]
- **ICG President's Award** (2019) [Awarded by the International Commission on Glass in recognition of "outstanding lifetime contributions to the international glass community in areas such as scientific discoveries, engineering developments, artistic accomplishments leadership and communications."]
- **Samuel R. Scholes Award Lecture** (2018) [The lecture is given at Inamori School of Engineering, Alfred University.]
- **ACerS Global Ambassador** (2018) [Awarded by the American Ceramic Society for outstanding leadership among the scientific and industrial glass community and volunteer contributions to the Society.]
- **Arthur L. Friedberg Ceramic Engineering Tutorial and Lecture Award** (2012) [Awarded by the National Institute of Ceramic Engineers and the American Ceramic Society.]
- **Specially Appointed Professor** (2013-2019) of China State Key Laboratory of Advanced Glass Technology for Float Glass (July 2013-June 2019)
- **Glass Service Modeling Award** (2007) [International award given for noteworthy contributions in field of mathematical modeling of glass manufacturing processes.]
- **Fellow of the Society of Glass Technology** (2001)
- **Fellow of the American Ceramic Society** (1997)
- **Best Paper Award** (1985) [From the Glass Industry Committee of the Industry Application Society of IEEE for a paper, "A Three-Dimensional Mathematical Model for Flow and Heat Transfer in Electric Glass Furnaces".]
- **Outstanding Young Chemical Engineer** (1985) [Awarded by the Central Ohio Section of the American Institute of Chemical Engineers for significant contributions in field of mathematical modeling of furnaces.]
- **Annual Student Paper Award** (1978) [Awarded by the Eastern Iron and Steel Society of American Institute of Mining, Metallurgical and Petroleum Engineers for a paper, "Optimization of Burden Size for a Blast Furnace".]

PROFESSIONAL HONORS AND AWARDS (continued)

- **Falih N. Darmara Materials Achievement Award** (1978) - awarded by the Department of Materials Science and Engineering at M.I.T. "in recognition of outstanding academic performance, excellent research work and extracurricular activities".
- **Professor S. K. Nandi Gold Medal (1974) -awarded by the Indian Institute of Technology, Kharagpur, India, for being "the best all-rounder" Chemical Engineering Student in the class of 1974.**
- **Institute Silver Medal (**1974) - awarded by the Indian Institute of Technology, Kharagpur, India, for securing first rank in the Chemical Engineering class of 1974
- **Nine major awards from Owens Corning**
    - **2 Slayter Awards (7/2001, 7/ 2002) -the highest technical achievement award at Owens Corning.**
    - **3 Vision to Reality Award (2 on 7 /1997, 7/1999) - the highest technical achievement award at Owens Corning before being named the Slayter Award.**
    - **3 Best Poster Awards (4/2006, 4/2007, 4/2008) -for technical posters and presentations at Owens Corning Science & Technology.**
    - **V. C. Rees Award (1985) for development and application of mathematical modeling capabilities at Owens Corning.**

CONTRIBUTIONS TO THE GLOBAL MATERIALS COMMUNITY

My long and active association with global materials community is summarized below.

- I have **attended over 100 international meetings and conferences,** given numerous keynote, plenary, invited & other lectures, organized symposia, and chaired technical sessions. I have **led** many organization and was the **Program Chair** of two major international conferences, and **Leader** of several international organizations.
- I have been an **Associate Editor of the International Journal of Applied Glass Science** since its beginning in 2010 and I am reviewer for numerous journals. I have **published widely**, written several book chapters, and am writing a text book on Glass Melting Process Fundamentals.
- Teaching has been an integral part of my career. I have **taught** at universities and forums in many parts of the world, including at the **International Commission (ICG) on Glass's summer and Winter Schools, ICG Tutorials** in India**,** and at the **Center for Functional and Surface Functionalized** Glass (FunGlass) in Slovakia. I was also a **Specially Appointed Professor at the China State Key Laboratory of Advanced Technology for Float Glass** (June 2013-June 2019).
- As the **ICG President during 2015-2018**, I played a pivotal role in the **UN International Year of Glass (IYOG)-2022** initiative. I formed and led the **North American Steering Committee for IYOG** consisting of the broadest cross section of the US and Canadian glass communities ever assembled and presided over an unprecedented **collaboration among them and between the North American and the international glass communities.**
- Collaboration among international glass and ceramic societies has been a driving force throughout my career. My leadership in this arena was recognized by the Global Ambassador award I received from the American Ceramic Society.

ADDENDUM

FULL LIST OF EXTERNAL PUBLICATIONS

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2. M. Choudhary, J. Szekely, and S. W. Weller, "The Effect of Flow Maldistribution on Conversion in a Catalytic Packed Bed Reactor, Part I: Analysis," A.I.Ch.E.J., 22, 1021 (1976).
3. M. Choudhary, S. W. Weller, and J. Szekely, "The Effect of Flow Maldistribution on Conversion in a Catalytic Packed Bed Reactor, Part II: Experimental Studies," A.I.Ch.E.J., 22, 1027 (1976).
4. J. Szekely, M. Choudhary, and Y. El Tawil, "On the Reduction of Metal Oxides with Mixed Gases," Met. Trans., 8, 639 (1977).
5. M. Choudhary and J. Szekely, "A Mathematical Representation of the Pool Profile, the Velocity and Temperature Fields in a Laboratory Scale ESR System," Proc. 6th International Vac. Met. Conf. on Special Melting, San Diego, 484 (1979).
6. M. Choudhary and J. Szekely, "The Modeling of Pool Profiles, Temperature Profiles and Velocity Fields in ESR Systems," Met. Trans., 11B, 439 (1980).
7. M. Choudhary and J. Szekely, "The Effect of Temperature Dependent Electrical Conductivity on Flow and Temperature Fields in Slags in ESR Systems," Met. Trans., 12B, 418 (1981).
8. M. Choudhary and J. Szekely, "The Modeling of Fluid Flow and Heat Transfer in an Industrial Scale ESR System," Ironmaking and Steelmaking, 8, 225 (1981).
9. M. Choudhary and J. Szekely, "Some General Characteristics of Heat and Fluid Flow Phenomena in Electric Melting and Smelting Operations," I.M.M. "C" 90, 164 (1981).
10. J. Szekely, M. Choudhary, and S. Woodruff, "Mathematical Models, Physical Models and Plant Scale Measurements on ESR Systems," Proc. 39th Electric Furnace Conference 1981.
11. M. Choudhary and J. Szekely, "The Modeling of Fluid Flow and Heat Transfer in an Industrial Scale ESR System," Ironmaking and Steelmaking, 8, 225 (1981).
12. M. Choudhary, J. Szekely, B. I. Medovar, and Y. G. Emelyanenko, “The Velocity Field in the Molten Slag Region of ESR Systems: A Comparison of Measurements in a Model System with Theoretical Predictions” Met. Trans., 13B, 35-43 (1981).
13. J. Szekely, J. McKelliget, and M. Choudhary, "Heat Transfer Fluid Flow and Bath Circulation in Electric-Arc Furnaces and DC Plasma Furnaces," Ironmaking and Steelmaking, 10, 169 (1983).
14. M. Choudhary and J. Szekely, "A Comprehensive Representation of Heat and Fluid Flow Phenomena in ESR Systems," ISS Trans, 3, 67 (1983).
15. K. Miyazawa, T. Fukaya, S. Asai, I. Muchi, M. Choudhary, and J. Szekely, "The Effect of an Externally Imposed Magnetic Field on the Behavior of a Laboratory Scale ESR System," Trans. ISIJ, 25, 386 (1985).
16. M. Choudhary, "A Three-dimensional Mathematical Model for Flow and Heat Transfer in Electric Glass Furnaces", IEEE Trans. on Industry Appl., IA-22, 912 (1986).
17. M. Choudhary, "A Modeling Study of Flow and Heat Transfer in an Electric Glass Melter", Journal of Non-Crystalline Solids, 101, 41 (1988).
18. M. Choudhary, "The Effect of Free Convection on the Dissolution of a Spherical Particle in a Viscous Melt", Glass Technology, 29, 100 (1988).
19. M. Choudhary, "Free Convection Effects on the Dissolution of a Spherical Particle", Proc. First International Conference on Advances in the Fusion of Glass, Am. Ceram. Soc., 11.1 (1988).
20. M. Choudhary, "Analysis of Heat Transfer in the Corroding Sidewall of a Furnace", J. Am. Ceram. Soc., 72, 2325 (1989).
21. M. Choudhary, "Dissolution of Polydisperse Silica Grains in Glass Melts - Analysis", J. Am. Ceram. Soc., 73, 3053 (1990).
22. M. Choudhary, "Fundamental Aspects of Electric Melting of Glass", Nuclear Waste Management IV, Ceramic Transactions, Vol. 23, Am. Ceram. Soc., 369 (1991).
23. M. Choudhary, "Mathematical Modeling of Flow and Heat Transfer Phenomena in Glass Furnace Channels and Forehearths", J. Am. Ceram. Soc., 74, 3091 (1991).

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25. M. Choudhary, "A Modeling Study of Flow and Heat Transfer in Channels and Forehearths of Glass Furnaces", Advances in Fusion and Processing of Glass, Ceramic Transactions, Vol 29, 605 (1993).
26. M. Choudhary, "Mathematical Modeling of MHD and Buoyancy Driven Flow in Electric Furnaces", II International Seminar on Mathematical Simulation in Glass Melting", Czech Glass Society, 87 (1993).
27. M. K. Choudhary and D. M. Krol (editors), "Extended Abstracts, 1994 Fall Meeting of The American Ceramic Society", Nov. 9-11, 1994.
28. M. K. Choudhary, "A Modeling study of Flow and Heat Transfer in the Vicinity of an Electrode", Proc. the 17th International Congress on Glass, Beijing, 6, 100 (1995).
29. R. M. Potter and M. K. Choudhary, "Calculation of Radiation Conductivity in Silicate Glass Melts", Proc. the 17th International Congress on Glass, Beijing, 3, 245 (1995).
30. M. K. Choudhary, "Needs of the Glass Industry Defined for Mathematical Modeling", the Glass Researcher, 3, No. 2, 7(1997).
31. M. K. Choudhary, "Some Perspectives on Mathematical Modeling of Glass Melting Process", Proceedings IV International Seminar on Mathematical Simulation of Glass Melting", Czech Glass Society, 1 (1997).
32. M. K. Choudhary, "Mathematical Modeling of Flow and Heat Transfer Phenomena in Electric Glass Melting Furnaces" Proceedings of the Julian Szekely Memorial Symposium on Materials Processing, The Minerals, Metals and Materials Society, 341 (1997).
33. M. K. Choudhary and N. T. Huff, "Mathematical Modeling in the Glass Industry: An Overview of Status and Needs", Glass Science and Technology- Glastechnische Berichte, Vol 70, 363 (1997).
34. K. A. Van Dyke and M. K. Choudhary, "Experimental Investigation of Flow and Heat Transfer in an Electrically Heated Viscous Liquid", Advances in Fusion and Processing of Glass II, Ceramic Transactions, Vol 82, 161 (1998).
35. M. K. Choudhary, "Modeling of Free Surface Flow in Glass Furnace Forehearths", Proceedings of the XVIII International Congress on Glass, Am. Cer. Society, Westerville, Ohio (1998).
36. M. K. Choudhary et al. (editors), "Proceedings of the XVIII International Congress on Glass", Am. Cer. Society, Westerville, Ohio (1998).
37. M. K. Choudhary, "Analysis and Modeling of NOx and Particulate Emissions from Glass Furnaces", Proceedings 5th International Seminar on Mathematical Simulation in Glass Melting, Czech Glass Society, 1 (1999).
38. M. K. Choudhary, "Mathematical Modeling of Transport Phenomena in Glass Furnaces: An Overview of Status and Needs", Proceedings "Glass in the New Millennium", International Commission on Glass, T1.1 (2000).
39. M. K. Choudhary, "Challenges and Opportunities for Glass Melting Technologies: A Transport Phenomena Perspective", Proceedings VI International Seminar on Mathematical Simulation in Glass Melting, Czech Glass Society, 1 (2001).
40. M. K. Choudhary, "Recent Advances in Mathematical Modeling of Flow and Heat Transfer Phenomena in Glass Furnaces", J. Am. Cer. Society, Vol. 85, No. 5, 1030 (2002).
41. M. K. Choudhary, T. A. Powers, W. H. Fausey, P. Budik, and J. Chmelar, "An Integrated Approach to Mathematical Modeling of Flow and Heat Transfer in the Melting and Delivery Ends of a Glass Furnace", Glass Technology, Vol 43C, 4 (2002).
42. M. K. Choudhary, "Process and Product Innovation through Mathematical Modeling of Transport Phenomena", Proceedings VII International Seminar on Mathematical Simulation in Glass Melting, Czech Glass Society, 1 (2003).
43. M. K. Choudhary, K. C. Karki, S. V. Patankar, "Mathematical Modeling of Heat Transfer, Condensation, and Capillary Flow in Porous Insulation on a Cold Pipe", International Journal of Heat and Mass Transfer, Vol 47, 5629 (2004).
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45. M. Choudhary, Y. Delaviz, R. Loh, M. Polasky, C. Wan, D. B. Todd, K. S. Hyun, S. Dey, and F. Wu, "Measurement of Shear Viscosity and Solubility of Polystyrene Melt Containing Various Blowing Agents", J. Cellular Plastics, Vol 41, 589 (2005).
46. M. K. Choudhary and R. M. Potter, "Heat transfer in Glass Melts", Properties of Glass Forming Melts, ed. L.D. Pye, A. Montenero, and I. Joseph, Taylor & Francis, New York, 249-293 (2005).

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48. M. K. Choudhary and J. A. Kulkarni, "Modeling of Three-dimensional Flow and Heat transfer in Polystyrene Foam Extrusion Dies", Polymer Engineering and Science, Vol 48, 1177(2008).
49. Z. Zhu, J. H. Zing, C. B. Park, and M. Choudhary, "Effect of Loss of Blowing Agents on Thermal Insulation Properties of Polystyrene Foams", J. Heat Transfer, Vol 131, 052603 (2009).
50. M. Choudhary, J. Kulkarni, Y. Delaviz, and R. Loh, "A Computational Fluid Dynamics Based Study of Nucleation and Growth in Polymer Foam Extrusion", Foams ® 2009- Proceedings of the 7th International Congress on Foam Processing and Technology, Society of Plastics Engineers, Sept 16-17, 2009, 314 (2009).
51. M. K. Choudhary, C. Kasprzak, R. H. Larson, and R. Venuturumilli, "ASHRAE Standard 90.1 Metal Building U-Factors-Part 1: Mathematical Modeling and Validation by Calibrated Hot Box Measurements", ASHRAE Transactions 2010, Vol 116, Part 1, 157-168 (2010).
52. M. K. Choudhary, and C. Kasprzak, "ASHRAE Standard 90.1 Metal Building U-Factors- Part 2: A Systems Based Approach for Predicting the Thermal Performance of Single Layer Fiberglass Batt Insulation Assemblies", ASHRAE Transactions 2010, Vol 116, Part 1, 169-178 (2010).
53. M. K. Choudhary, R. Venuturumilli, and M. R. Hyre, "Mathematical Modeling of Glass Melting, Delivery, and Forming Processes", Int. J. of Applied Glass Science, Vol 1, No. 2, 188-214 (2010).
54. M. K. Choudhary, "Comments on a New Method to Optimize Furnace Designs Using Daily Flow Rates to Maximize Energy Savings in the Steady Production", J. Am. Cer. Soc., Vol 93 [6], 1803 (2010).
55. M. K. Choudhary, C. Kasprzak, D. Musick, R. H. Larson, and M. Henry," ASHRAE Standard 90.1 Metal Building U-factors-Part 5: Mathematical Modeling of Wall Assemblies and Validation by Calibrated Hot Box Measurements", ASHRAE Transactions, Vol 118, 400-408(2012).
56. M. K. Choudhary," A General Approach for Predicting the Thermal Performance of Metal Building Fiberglass Insulation Assemblies", ASHRAE Transactions, Vol 122,167-178 (2016).
57. M. K. Choudhary, B. Purnode, A.M. Lankhorst, A.F.J.A. Habraken, "Radiative Heat Transfer in Processing of Glass-Forming Melts", Int. J. of Applied Glass Science, Vol 19, Issue 2, 218-234 (2018).
58. M. Choudhary, "Heat Transfer Phenomena in Industrial Glass Melting and Delivery Processes", in Teaching Glass Better, Takada, Duran, Parker and Bange (Eds.). (Book to mark the 10th Anniversary of the International Commission on Glass Summer School on Glass Science & Technology), International Commission on Glass, 287-309 (2018).
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60. M. K. Choudhary, "Geometric optics based analysis of radiation heat transfer in glass melting furnace foams", Int. J. of Applied Glass Science, 12, pp 337-347 (2021).
61. M. K. Choudhary, "Mathematical Modeling of Rate Phenomena in Glass Melting Furnaces", in Fiberglass Science and Technology: Chemistry, Processing, Characterization, Applications and Sustainability, Hong Li (Editor), Springer, pp 483-539 (2021).
62. M. K. Choudhary, L. D. Pye, and A. Duran, "The United Nations International Year of Glass-2022, Chapter 1 in 82nd Conference on Glass Problems: Ceramic Transactions, Volume 270, S. K. Sundaram (Editor), Wiley (2022).
63. M. K. Choudhary, "Radiation Heat Transfer in Glass Melts: Key Concepts and Phenomena" in Glasses and Glass-Ceramics: Advanced Processing and Applications, K. Annapurna and A. R. Molla (Editors), Springer, Nature, pp 77-108 (2022).