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155. “Optoelectronic and material properties of nanocrystal-based CZTSe solar cells though with Ag-alloying”, C. J. Hages, M. J. Koeper and R. Agrawal, *Solar Energy Materials and Solar Cells*, 145, 342 (2016)
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TECHNICAL PRESENTATIONS

1. "Hydrodemetallation of Nickel and Vanadium Porphyrins", R. Agrawal and J. Wei, AIChE Meeting, Chicago (1980).
2. "Membrane/Cryogenic Hybrid Process for Hydrogen Purification", R. Agrawal, S. R. Auvil and J. S. Choe, AIChE Summer National Meeting, Minneapolis (1987).
3. "Membrane/Cryogenic Hybrid Systems for Helium Purification", J. S. Choe, R. Agrawal, S. R. Auvil and T. R. White, Annual Convention of the Sixty-Seventh Gas Processors Association, Dallas (1988).
4. "Membrane/Cryogenic Hybrid Scheme for Argon Production from Air", R. Agrawal, S. R. Auvil, J. S. Choe and D. W. Woodward, AIChE Summer National Meeting, Denver (1988).
5. "High Efficiency Processes for Cryogenic Air Separation", R. Agrawal, D. C. Erickson, and D. W. Woodward, The Seventh Intersociety Cryogenics Symposium, Houston (1989).
6. "Oxygen Plants for IGCC", J. M. Abrardo, R. Agrawal, A. R. Smith and D. W. Woodward, The Seventh Intersociety Cryogenics Symposium, Houston (1989).
7. "Efficient Cryogenic Nitrogen Generators - An Exergy Analysis", R. Agrawal and D. W. Woodward, AIChE Spring National Meeting, Orlando (1990).
8. "Efficient Processes to Produce Nitrogen by Cryogenic Air Separation", R. Agrawal, D. W. Woodward, W. T. Kleinberg and K. B. Wilson, Low Temperature and Cryogenic Conference 1990, Southampton, U.K. (1990).
9. "Membrane/Adsorption Hybrids for Gas Separation", J. S. Choe, R. Agrawal, S. R. Auvil, R. Srinivasan and R. M. Thorogood, International Congress on Membranes and Membrane Processes, ICOM'90 Chicago (1990).
10. "Production of Ultra-high Purity Oxygen for the Electronic Industry", R. Agrawal and W. T. Kleinberg, AIChE Spring National Meeting, Houston (1991).
11. "Membrane/Adsorption Hybrids for Gas Separation", J. S. Choe, R. Agrawal and S. R. Auvil, AIChE Spring National Meeting, Houston (1991).
12. "Production of Medium Pressure Nitrogen", R. Agrawal and R. M. Thorogood, Gas Separation International Meeting, Austin (1991).
13. "Impact of Low Pressure Drop Structure Packing on Argon Production and Purification from Air", R. Agrawal and D. W. Woodward, XVIIIth International Congress of Refrigeration, Montreal, Canada (1991).
14. "Efficient Processes to Produce Ultra-high Purity Nitrogen from Air", R. Agrawal and W. T. Kleinberg, XVIIIth International Congress of Refrigeration, Montreal, Canada (1991).

15. "Multi-component Distillation with Column Integration", R. Agrawal and D. W. Woodward, Annual AIChE Meeting, Los Angeles (1991).
16. "Production of Ultra-high Purity Nitrogen and Oxygen", R. Agrawal and W. T. Kleinberg, Annual AIChE Meeting, Los Angeles (1991).
17. "Recent Advances in Argon Production and Purification in Cryogenic Air Separation", R. Agrawal, D. W. Woodward, J. C. Peterson and K. W. Kovak, AIChE Spring Meeting, New Orleans, LA (1992).
18. "Impact of Low Pressure Drop Structure Packing on Air Distillation", R. Agrawal, D. W. Woodward, K. A. Ludwig, and D. L. Bennett, Fifth International Symposium on Distillation and Absorption, Institution of Chemical Engineers, Birmingham, September 1992.
19. "Argon Production from Elevated Pressure Air Distillation Processes", R. Agrawal and T. F. Yee, Intersociety Cryogenic Symposium, Houston, 31 January - 4 February 1993.
20. "Heat Pumps in Thermally Linked Distillation Columns", R. Agrawal and T. F. Yee, AIChE Spring Meeting, Houston, TX (1993).
21. "Nitrogen Generators", R. Agrawal, AIChE Spring Meeting, Houston, TX (1993).
22. "More Intercolumn Thermal Integration in Thermally Linked Columns", R. Agrawal, AIChE Annual Meeting, St. Louis, MI (1993).
23. "LNG Cold Recovery Air Separation Unit", R. Agrawal, M. R. Alvarez and R.M. McGuinness, AIChE Spring Meeting, Atlanta, GA (1994).
24. "Novel Membrane Schemes for Higher Purity/Recovery Separations", J. Xu and R. Agrawal, Sixth Annual Meeting of the North American Membrane Society, Breckenridge, CO (1994).
25. "Separation Devices for Gas Mixing", R. Agrawal and J. Xu, 1994, Gordon Research Conference on Separation and Purification, Colby-Sawyer College, New London, NH (1994).
26. "Analysis of Alternative Column Design Utilizing Waste Heat in Distillation", Z. T. Fidkowski and R. Agrawal, Paper # 30d, AIChE Spring National Meeting, Houston, TX (1995).
27. "Novel Membrane Cascades for Gas Separation and Their Thermodynamic Analysis", J. Xu and R. Agrawal, Seventh Annual Meeting of the North American Membrane Society, Portland, OR (1995).
28. "Efficient Process to Produce Tonnage Nitrogen", R. Agrawal and D. W. Woodward, 19th International Congress of Refrigeration, The Hague, The Netherlands, August 20-25, 1995.
29. "Local Thermodynamic Efficiency of Permeation and Membrane Separator Design", J. Xu and R. Agrawal, Paper # 23c, 1995 Annual AIChE Meeting, November 12-17, Miami Beach, FL.
30. "Synthesis of a Distillation Column Configuration for a Multi-component Separation", Paper # 187e, 1995 Annual AIChE Meeting, November 12-17, Miami Beach, FL.

31. "Energy Integrated Distillation Systems - Lower Energy Requirements without Changing Temperatures of Utilities", Paper # 189g, 1995 Annual AIChE Meeting, November 12-17, Miami Beach, FL.
32. "A Method to Draw Gas Separation Membrane Cascades with Limited Number of Compressors", R. Agrawal and J. Xu, Eighth Annual Meeting of the North American Membrane Society, Ottawa, Canada (1996).
33. "A Systematic Procedure for Drawing Gas Separation Membrane Cascades with Limited Number of Compressors", R. Agrawal and J. Xu, Paper # S-4-2-1, 1996 International Congress on Membranes and Membrane Processes, ICOM'96, August 18-23, Yokohama, Japan.
34. "Production of Ultra-high Purity Nitrogen Free of Light Impurities", R. Agrawal, D. W. Woodward and A. Modi, MUST'96, Munich Meeting on Air Separation Technology, October 10-11, 1996.
35. "Columns with Intermediate Heat Exchangers for Separation of a Tangent Pinch Mixture", R. Agrawal and Z. T. Fidkowski, Paper # 5b, 1996 Annual AIChE Meeting, November 10-15, Chicago, IL.
36. "A Method to Synthesize Gas Separation Membrane Cascade Structures with Small Number of Compressors", Paper # 25d, 1996 Annual AIChE Meeting, November 10-15, Chicago, IL.
37. "Study of Binary Distillation through Thermodynamic Efficiency," R. Agrawal and D. M. Herron, Eleventh Intersociety Cryogenic Symposium, Houston, January 28-30, 1997.
38. "Study of Binary Distillation through Thermodynamic Efficiency," R. Agrawal and D. M. Herron, 1997 Spring National AIChE Meeting, Houston, March 9-13, 1997.
39. "Coproduction of High Purity Products Using Thermally-Linked Columns," R. Agrawal, D. W. Woodward and A. K. Modi, International Symposium on Distillation and Absorption, Institution of Chemical Engineers, Maastricht, The Netherlands, September 8-10, 1997.
40. "Optimum Configuration for Addition or Removal of Heat from an Intermediate Location of a Binary Distillation Column," R. Agrawal and D. M. Herron, Paper #198e, 1997 Annual AIChE Meeting, November 16-21, Los Angeles, CA.
41. "Advanced Cryogenic Air Separation Plants for Carbonaceous Fuel-Based Ammonia Synthesis," J. Xu and R. Agrawal, Cryogenics and Refrigeration Conference, ICCR'98, Hangzhou, China, April 21-24, 1998.
42. "Thermally Coupled Columns: Are They Always Efficient?," R. Agrawal and Z. T. Fidkowski, Annual AIChE Meeting, November 16-20, 1998, Miami Beach, FL.
43. "More Operable Arrangements of Thermally Coupled Distillation Columns", R. Agrawal and Z. T. Fidkowski, AIChE Spring National Meeting, March 1999, Houston, TX.

44. "Improving Efficiency of Distillation with New Thermally Coupled Configurations and Columns", R. Agrawal and Z. T. Fidkowski, FOCAPD '99 Computer-Aided Design in the 21st Century, July, 1999, Breckenridge, Colorado.
45. "Production of Low-Purity Oxygen in the Next Millennium", R. Agrawal and D. M. Herron, 20th International Congress of Refrigeration, September, 1999, Sydney, Australia.
46. "Simplified Thermally Coupled Arrangement for Ternary Distillation", R. Agrawal and Z. T. Fidkowski, Annual AIChE Meeting, November, 1999, Dallas, TX.
47. "Nitrogen Liquefaction Processes", R. Agrawal, D. M. Herron, A. A. Brostow and M. J. Roberts, International Cryogenic Engineering Conference (ICEC18), Mumbai, India, February, 2000.
48. "Multi-component Thermally Coupled Systems of Distillation Columns at Minimum Reflex", Z. T. Fidkowski and R. Agrawal, Paper #242C, AIChE Annual National Meeting, Nov. 2000, Los Angeles, CA.
49. "Further Reduction in Heat Demand of Thermally Coupled Configurations through Double-Effect Distillation", R. Agrawal, Paper #246a, AIChE Annual National Meeting, Nov. 2000, Los Angeles, CA.
50. "Column Configurations for Ternary Distillation with the Same Number of Reboilers – Condensers", Z. T. Fidkowski and R. Agrawal, Paper #1f, AIChE Spring Meeting, April 2000, Houston, TX.
51. "Reducing Heat Duty of Conventional Multi-component Distillation Columns with No Thermal Coupling", R. Agrawal, Paper 1b, AIChE Spring Meeting, April 2000, Houston, TX.
52. "Feed Pretreatment for Binary Distillation Efficiency Improvement", R. Agrawal and D. M. Herron, ESCAPE 11, May 2001, Kolding, Denmark.
53. "Hybrid Cryogenic Liquefaction Processes", R. Agrawal, A. A. Brostow, D. M. Herron and M. J. Roberts, XXI IIR International Congress of Refrigeration, August 2003, Washington, DC.
54. "Synthesis of Multicomponent Distillation Column Configurations", R. Agrawal, AIChE Annual National Meeting, Nov. 2003, San Francisco, CA.
55. "Partially Thermally Coupled Systems of Distillation Columns", R. Agrawal and Z. T. Fidkowski, AIChE Annual National Meeting, Nov. 2003, San Francisco, CA.
56. "Particle Swarm Optimization in Discontinuous Function Spaces", A. Giridhar, B. B. Krishnamurthy, R. Agrawal, V. Venkatasubramanian, AIChE Annual National Meeting, Nov. 2005, Cincinnati, OH.
57. "Formulation of Search Spaces for Separation Networks", A. Giridhar, V. Venkatasubramanian, R. Agrawal, AIChE Annual National Meeting, Nov. 2005, Cincinnati, OH.

58. "A Novel Search Space Formulation for the Synthesis of Separation Networks", A. Giridhar, R. Agrawal, V. Venkatasubramanian, AIChE Annual National Meeting, Nov. 2006, San Francisco, CA.
59. "New Energy-Efficient and Low-Cost Multicomponent Distillation Configurations", A. Giridhar and R. Agrawal, AIChE Spring National Meeting, April 2007, Houston, TX.
60. "Synthesis of Optimal Distillation Networks", A. Giridhar and R. Agrawal, AIChE Annual National Meeting, Nov. 2007, Salt Lake City, UT.
61. "Development of Low-Cost CuInSe₂ Nanocrystal-Ink Based Solar Cells", R. Agrawal, H. Hillhouse, Q. Guo, and M. Kar, AIChE Annual National Meeting, Nov. 2007, Salt Lake City, UT.
62. "New Insights into the Ideal Cascade Theory for Membrane Separation Processes", R. Pathare and R. Agrawal, AIChE Annual National Meeting, Nov. 2007, Salt Lake City, UT.
63. "An Environmentally Friendly Novel Route for the Transportation Fuel", R. Agrawal, N. Singh, F. Ribeiro, and W. N. Delgass, AIChE Annual National Meeting, Nov. 2007, Salt Lake City, UT.
64. "New and Novel Batch Distillation Processes", R. Agrawal and G. S. Joglekar, AIChE Annual National Meeting, Nov. 2007, Salt Lake City, UT.
65. "Reducing Energy Consumption by New Distillation Configurations", L. Zhang, A. Linninger and R. Agrawal, 11th Topical on Refinery processing, AIChE Annual Spring Meeting, 9th April, 2008, New Orleans, LA.
66. "Developing Membrane Separation Process fundamentals for Energy Savings", R. Pathare and R. Agrawal, Gordon Research Conference on Membranes: Materials and Processes, August, 2008, New London, NH
67. "Membrane Cascade Design Fundamentals for Energy Savings", R. Pathare and R. Agrawal, AIChE Annual National Meeting, Nov. 2008, Philadelphia, PA
68. "A Computationally Efficient Method to Generate a Complete Search Space for Multicomponent Distillation Sequences", V. Shah, A. Giridhar and R. Agrawal, AIChE Annual National Meeting, Nov. 2008, Philadelphia, PA
69. "Dynamic Modeling and Optimization of Thermally Coupled Dual-Column Batch Distillation Processes", G. Joglekar and R. Agrawal, AIChE Annual National Meeting, Nov. 2008, Philadelphia, PA
70. "Synergistic Use of Solar Hydrogen with Biomass to Produce Biofuels", N. R. Singh, F.H. Ribeiro, W. N. Delgass and R. Agrawal, AIChE Annual National Meeting, Nov. 2008, Philadelphia, PA

71. "Efficiency comparison of distillation schemes: heat integrated distillation column (HIDiC) and heat pump systems" R. Agrawal, A. Shenvi and D. Michael Herron, AIChE Spring National Meeting, April 2009, Tampa, FL
72. "Synthesis and quick identification of low-energy sequences for multicomponent distillation", V. Shah and R. Agrawal, AIChE Spring National Meeting, April 2009, Tampa, FL
73. "Dynamic Modeling and Optimization of Thermally Coupled Dividing Wall Column Batch Distillation Processes", R. Agrawal and G. S. Joglekar, AIChE Spring National Meeting, April 2009, Tampa, FL
74. "Membrane Cascade Synthesis Fundamentals for Energy Savings", R. Pathare and R. Agrawal, NAMS 2009, June 2009, Charleston, SC
75. "Selenization of Copper Indium Gallium Disulfide Nanocrystal Films for Thin Film Solar Cells", Q.J. Guo, G. M. Ford, H. W. Hillhouse and R. Agrawal, PVSC 34, June 2009, Philadelphia, Pa
76. "Synergistic Routes to Liquid Fuel for a Petroleum Deprived Future", N.R. Singh and R. Agrawal, AIChE Annual Meeting, November 2009, Nashville, TN
77. "Reaction Mechanism for the Formation of CuInSe₂ Nanocrystals for Low-Cost Solar Cells", M. Kar, H. W. Hillhouse and R. Agrawal, AIChE Annual Meeting, November 2009, Nashville, TN
78. "Energy Efficient Membrane Cascade Design for Binary and Multicomponent Applications", R. Pathare and R. Agrawal, AIChE Annual Meeting, November 2009, Nashville, TN
79. "Thermal Coupling in Multicomponent Distillation Sequences", V.H. Shah and R. Agrawal, AIChE Annual Meeting, November 2009, Nashville, TN
80. "Heat Integrated Distillation Column (HIDiC) Versus Heat Pump Systems", A. A. Shenvi, D. M. Herron and R. Agrawal, AIChE Annual Meeting, November 2009, Nashville, TN
81. "CIGS Nanocrystal Inks for the Fabrication of Air Stable Thin Film Solar Cells", Q. J. Guo, H. W. Hillhouse and R. Agrawal, AIChE Annual Meeting, November 2009, Nashville, TN
82. "Systems Approach Toward Maximizing Liquid Fuel Yield from Biomass", D. S. Mallapragada, W. N. Delgass, F. H. Ribeiro, and R. Agrawal, Frontiers in Bioenergy Symposium, May 2010, Purdue University, IN.
83. "Solar Cells via Selenization of CuInS₂ Nanocrystals: Effect of Synthesis Precursor", G. M. Ford, Qijie Guo, R. Agrawal and H. W. Hillhouse, PVSC 35, June 2010, Honolulu, Hawaii
84. "Finding Globally Optimal Minimum Heat Duty for Multicomponent Distillation Sequences", Ulaganathan Nallasivam, Vishesh H. Shah, Mohit Tawarmalani, Rakesh Agrawal, AIChE Annual Meeting, November 2010, Salt Lake City, Utah.

85. “The Scope of Using Concentrated Solar Energy to Produce Liquid Fuels from Biomass”, Dharik, Mallapragada, W. Nicholas Delgass, Fabio H. Ribeiro, Rakesh Agrawal, AIChE Annual Meeting, November 2010, Salt Lake City, Utah.
86. “A Method for Multicomponent Distillation Sequences with Fewer Columns”, Anirudh A. Shenvi, Vishesh H. Shah, Jeremy Zeller, Rakesh Agrawal, AIChE Annual Meeting, November 2010, Salt Lake City, Utah.
87. “Energy Systems Analysis for a Renewable Transportation Sector”, D. S. Mallapragada, N. R. Singh and R. Agrawal, Proceedings 21st European Symposium on Computer Aided Process Engineering- ESCAPE-21, May 2011, Porto Carras, Chalkidiki, Greece, 2011
88. “A Generalized and Robust Method for Efficient Photovoltaic Devices from Multinary Sulfide Nanocrystal Inks”, Q. J. Guo, G. M. Ford, H. W. Hillhouse, and R. Agrawal, PVSC 37 Conference, June, 2011, Seattle, WA.
89. “Analyzing Phase Transformation in the Growth of CIGSe Films from Nanocrystals”, Bryce C. Walker, Erik Sheets, Rakesh Agrawal, AIChE Annual Meeting, October 2011, Minneapolis, MN.
90. “Band Gap Tuning with CZTS- Based Nanocrystal-Ink Solar Cells”, Grayson Ford, Rakesh Agrawal, Hugh W. Hillhouse, AIChE Annual Meeting, October 2011, Minneapolis, MN.
91. “High-Pressure Catalytic Hydrodeoxygenation of the Hydro-Pyrolysis Vapor Lignin Model Compounds”, Sara L. Yohe, W. Nicholas Delgass, Fabio H. Ribeiro, Rakesh Agrawal, AIChE Annual Meeting, October 2011, Minneapolis, MN.
92. “High-Pressure Fast Pyrolysis and Fast Hydropyrolysis for Conversion of Biomass to Liquid Fuels”, Vinod Kumar Venkatakrishnan, Andrew D. Smeltz, Sergey V. Semikolenov, Fabio H. Ribeiro, W. Nicholas Delgass, Rakesh Agrawal, AIChE Annual Meeting, October 2011, Minneapolis, MN.
93. “Direct Production of Molecules in the Fuel Range by Selective Tailoring of Biomass Fast Pyrolysis”, Piotr Gawecki, Fabio Ribeiro, W. Nicholas Delgass, Rakesh Agrawal, Andrew Smeltz, Matthew R. Hurt, David J. Borton II, Nelson R. Vinueza, Hilkka I. Kenttamaa, Nicholas J. Nugent, William E. Anderson, AIChE Annual Meeting, October 2011, Minneapolis, MN.
94. “A Method for Novel Multicomponent Distillation Sequences with Fewer Columns”, Anirudh A. Shenvi, Vishesh H. Shah, Rakesh Agrawal, AIChE Annual Meeting, October 2011, Minneapolis, MN.
95. “In-Situ Measurements of CZTSSe Film Formation from CZTS Nanoparticles”. Bryce Walker, Rakesh Agrawal, Roland Mainz, Humberto Rodriguez-Alvarez, Alfons Weber, Ole Zander, Cornelia Streeck, Thomas Unold, Hans-Werner Schock, MRS Spring Conference, April, 2012., San Francisco, CA.

96. “Low-cost and Earth-abundant Solar Cells Utilizing Nanoparticle Precursors”, W.C. Yang, N. J. Carter, C. J. Hages, E. J. Sheets, K. W. brew, B. C. walker, H. Y. Park, J. M. Moore, and R, Agrawal, NSF IGERT Project Meeting, 2012, Washington DC,
97. “Band Alignment Limitations and Light-Soaking Effects in CZTS_{1-x}Se and CZTGeS_{1-x}Se”, C. J. Hages, J. E. Moore, S. Dongaonkar, M. A. Alam, M. S. Lundstrom and R. Agrawal, PVSC 38 Conference June 2012, Austin, TX. (This paper won the best poster paper award)
98. “Influence of Ge Doping on the Defect Distributions of Cu₂Zn(Sn_xGe_{1-x})(S_ySe_{1-y}) Fabricated by Nanocrystal Ink Deposition”, J. E. Moore, C. J. Hages, M. S. Lundstrom and R. Agrawal, PVSC 38 Conference June 2012, Austin, TX. (This paper won the best oral presentation by a graduate student).
99. “Grain Growth Enhancement of Selenide CIGSe Nanoparticles to Densified Films Using Copper Selenides”, B. Walker, and R. Agrawal, PVSC 38 Conference June 2012, Austin, TX.
100. “Reverse Stress Metastability of Shunt Current in CIGS Solar Cells”, S. Dongaonkar, E. Sheets, R. Agrawal, and M. A Alam, PVSC 38 Conference June 2012, Austin, TX. (This paper was nominated for the best poster paper award).
101. “Synthesis Routes of Phosphorous-Free Semiconducting Selenide Nanoparticles for Photovoltaic Applications” B. C. Walker, S. M. Szcapaniak, B. Negash, S. M. McLeod, and R. Agrawal, AIChE Annual Meeting, October, 2012.
102. “Improved Performance of Earth-Abundant Cu₂ZnSn(S_xSe_{1-x})₄ Solar Cells Through Ge Incorporation”, C. Hages and R. Agrawal, AIChE Annual Meeting, October, 2012.
103. “Systematic Synthesis of Augmented Biomass-to-Liquid Fuel Processes” D. Mallapragada, W. N. Delgass, F. H. Ribeiro and R. Agrawal, AIChE Annual Meeting, October, 2012. (This paper was judged as the Best Presentation in the session)
104. “Design of Efficient Systems for Multicomponent Distillation”, G. Rampriya, M. Tawarmalani and R. Agrawal, AIChE Annual Meeting, October, 2012.
105. “Kinetics of High Pressure Catalytic Reaction Pathways for Dihydroeugenol Over Pt/ZrO₂”, S. Yohe, R. Agrawal, W. N. Delgass, and F.H. Ribeiro, AIChE Annual Meeting, October, 2012.
106. “New Class of Thermal Coupling Links in Multicomponent Distillation”, J. Huff, M. Tawarmalani, and R. Agrawal, AIChE Annual Meeting, October, 2012.
107. “Limiting Efficiencies for Solar Thermal Energy Conversion to Fuels”, D. Mallapragada, and R. Agrawal, AIChE Annual Meeting, October, 2012.
108. “Copper-zinc-tin Chalcogenide Absorbers Derived from Controlled Sulfide Nanocrystals of Wurtzite and Kesterite Structures”, W.-C. Yang, C. K. Miskin, C. J. Hages, E. A. Stach, and R. Agrawal, MRS Fall Meeting, November, 2012.

109. “Real-time Investigation of the Sintering Mechanism in Cu-Zn-Sn-S Nanocrystal Films for Photovoltaic Applications”, N. J. Carter, R. Mainz, B. C. Walker, W.C. Yang, A. Weber, O. Zander, S. Schmidt, E. A. Stach, T. Unold, and R. Agrawal, MRS Spring Meeting, April, 2013.
110. “Analysis of Recombination in $\text{Cu}_2\text{ZnSn}_{1-x}\text{Ge}_x\text{S}_y\text{Se}_{4-y}$ thin films by Photoluminescence Spectroscopy”, C. J. Hages, S. Levenco, T. Unold, and R. Agrawal, MRS Spring Meeting, April, 2013.
111. “Novel Metal-selenide Nanoparticle Synthesis from Phosphorous-free Routes”, B. C. Walker, and R. Agrawal, MRS Spring Meeting, April, 2013.
112. “Scalable Photovoltaics through Nanotechnology”, B. C. Walker, and R. Agrawal, MRS Spring Meeting, April, 2013.
113. “GWh Level Renewable Energy Storage and Supply using Liquid CO_2 ”, E Al-musleh, D.S. Mallapragada and R. Agrawal, 23rd European Symposium on Computer Aided Process Engineering –ESCAPE 23, June 9-12, Lappeenranta, Finland, 2013
114. "Analysis of Temperature-Dependent Current-Voltage Characteristics for CIGSSe and CZTSSe Thin Film Solar Cells from Nanocrystal Inks", N. J. Carter, C. J. Hages, J. E. Moore, S. M. McLeod, C. K. Miskin, C. Joglekar, M. S. Lundstrom, and R. Agrawal, 39th IEEE Photovoltaic Specialist Conference, Tampa, FL, 2013.
115. "High Efficiency $\text{Cu}_2\text{ZnSnS}_4$ Nanocrystal Ink Solar Cells through Improved Nanoparticle Synthesis and Selenization," C. K. Miskin, N. J. Carter, W.C. Yang, C. J. Hages, E. Stach, and R. Agrawal, 39th IEEE Photovoltaic Specialist Conference, Tampa, FL, 2013.
116. “Device Comparison of Champion Nanocrystal-Ink based CZTSSe and CIGSSe Solar Cells: Capacitance Spectroscopy”, C. J. Hages, N. J. Carter, S. M. McLeod[†], C. K. Miskin, C. Joglekar, and R. Agrawal, 39th IEEE Photovoltaic Specialist Conference, Tampa, FL, 2013.
117. “The Physics of V_{bi} -Related IV Crossover in Thin Film Solar Cells: Applications to Ink Deposited CZTSSe”, J. Moore, C. J. Hages, N. Carter, R. Agrawal and M. Lundstrom, 39th IEEE Photovoltaic Specialist Conference, Tampa, FL, 2013.
118. “CZTSe Devices Fabricated From CZTSSe Nanoparticles”, B. C. Walker, B. G. Negash, S. M. Szczepaniak, K. W. Brew and R. Agrawal, 39th IEEE Photovoltaic Specialist Conference, Tampa, FL, 2013.
119. “Fast Hydrolysis and Hydrodeoxygenation of Biomass Model Compounds”, D. D. Mehta, A. D. Smeltz, N. J. Nugent, W. E. Anderson, W. N. Delgass, R. Agrawal and F. H. Ribeiro, AIChE Annual Meeting, San Francisco, 2013
120. “Fast Hydrolysis and Catalytic Hydrodeoxygenation of Cellulose in a Micro-Scale Batch Reactor”, H. J. Choudhari, W. N. Delgass, F. H. Ribeiro and R. Agrawal, AIChE Annual Meeting, San Francisco, 2013.

121. "Fast-hydroxyolysis and Catalytic Hydrodeoxygenation for Conversion of Biomass to Liquid Fuel", V. K. Venkatakrisnan, J. Degenstein, W. N. Delgass, R. Agrawal and F. H. Ribeiro, AIChE Annual Meeting, San Francisco, 2013.
122. "Process Design of GWh Level Renewable Energy Storage and Supply Using Liquid CO₂", E. I. Al-musleh, D. S. Mallapragada and R. Agrawal, AIChE Annual Meeting, San Francisco, 2013.
123. "High Pressure Catalytic Reaction Pathways and Kinetics of the Lignin Model Compound Dihydroeugenol over 2%Pt/ZrO₂", S. L. Yohe, W. N. Delgass, F. H. Ribeiro and R. Agrawal, North American Catalysis Society, Louisville, 2013.
124. "A New Screening Tool for Designing Energy-Efficient Distillation Systems", J. Huff, M. Tawarmalani and R. Agrawal, AIChE Spring Meeting, New Orleans, LA, April, 2014.
125. "More Operable Dividing Wall Columns", G. M. Ramapriya and R. Agrawal, AIChE Spring Meeting, New Orleans, LA, April, 2014.
126. "The Potential of Nanocrystal Ink-based Processing for Chalcogenide Photovoltaics", C. J. Hages, C. K. Miskin, W.-C. Yang, S. M. McLeod, N. J. Carter, and R. Agrawal, 40th IEEE Photovoltaic Specialist Conference, Denver, CO, June, 2014.
127. "Characterization of Nanocrystal-Ink Based CZTSSe and CIGSSe Solar Cells Using Voltage-Dependent Admittance Spectroscopy", X. Sun, C. J. Hages, N. J. Carter, J. E. Moore, R. Agrawal and M. Lundstrom, 40th IEEE Photovoltaic Specialist Conference, Denver, CO, June, 2014.
128. "Synergistic Biomass and Natural gas Conversion to Liquid Fuel With Reduced CO₂ Emissions", E. Gençer, D. S. Mallapragada, M. Tawarmalani and R. Agrawal, FOCAPD 2014, Cle Elum, WA, July 2014.
129. "New, Useful Dividing Wall Columns for Sustainable Distillation", G. Madenoor Ramapriya, M. Tawarmalani and R. Agrawal, 10th International Conference on Distillation & Absorption", Friedrichshafen, Germany, September 2014.
130. "Synergistic Biomass and Natural Gas Process Design for Liquid Fuel Production with Reduced CO₂ Emissions", E. Gençer, D. S. Mallapragada, M. Tawarmalani, R. Agrawal, AIChE Annual Meeting, Atlanta, GA, November, 2014
131. "Dimethyl Ether Chemical Storage Cycle for Uninterrupted Renewable Power Supply", E. Gençer, E. I. Al-musleh, D. S. Mallapragada, R. Agrawal, AIChE Annual Meeting, Atlanta, GA, November, 2014
132. "High Efficiency Solar Thermal Power and Integrated Hydrogen Storage Cycles for Continuous Grid Power Supply", E. Gençer, D. S. Mallapragada, F. Maréchal, M. Tawarmalani, R. Agrawal, AIChE Annual Meeting, Atlanta, GA, November, 2014

133. “The Development of CZTSSe and CZTGeSSe Solar Cells, C. J. Hages, R. Agrawal, AIChE Annual Meeting, Atlanta, GA, November, 2014 (This talk was presented by C. J. Hages as Graduate Student Award Finalists)
134. “Plethora of Dividing Wall Columns for Fully Thermally Coupled Distillation”, G. Madenoor, Ramapriya, M. Tawarmalani, R. Agrawal, AIChE Annual Meeting, Atlanta, GA, November, 2014
135. “Nanoparticle-based Earth-Abundant CZTSSe and CZTGeSSe Solar Cells: Current Progress and Efficiency Limitations, C. J. Hages, W. –C. Yang, N. J. Carter, E. A. Stach, T. Unold and R. Agrawal, AIChE Annual Meeting, Atlanta, GA, November, 2014.
136. “The Role of Potential Fluctuations in Voltage Limitations for CZTSSe Solar Cells’, C. J. Hages, W. –C. Yang, N. J. Carter, E. A. Stach, T. Unold and R. Agrawal, World Conference on Photovoltaic Energy Conversion (WCPEC), 2014 IEEE conference, Kyoto, Japan, Nov. 2014
137. “Efficient Solar Thermal Integrated Power and Chemical Production Cycles for Uninterrupted Power’, E. Gençer, M. Tawarmalani R. Agrawal, 7th Annual AIChE Midwest Regional Conference, Chicago, IL, March 2015.
138. “A versatile Solution Route to Efficient $\text{Cu}_2\text{ZnSn}(\text{S},\text{Se})_4$ Thin Film Solar Cells”, R. Zhang, S. Szczepaniak, R. Agrawal, C. A. Handwerker, MRS Spring Meeting, San Francisco, CA., April, 2015.
139. “Synthesis of New Dividing Wall Columns for Thermally Coupled Distillation”, G. Madenoor, Ramapriya, M. Tawarmalani, R. Agrawal, AIChE Spring Meeting, Austin, TX, April, 2015
140. “Integrated Solar Thermal Hydrogen and Power Coproduction Process for Continuous Power Supply and Production of Chemicals”, E. Gençer, M. Tawarmalani and R. Agrawal, Proceedings of the 12th International Symposium on Process Systems Engineering and 25th European Symposium on Computer Aided Process Engineering. 31 May – 4 June 2015, Copenhagen, Denmark.
141. “Current-Voltage Analysis of Band Tail Effects in CZTSSe through Numerical Simulation”, J. E. Moore, C. J. Hages, N. J. Carter, R. Agrawal, J. L. Gray, M. S. Lundstrom, 42nd IEEE Photovoltaic Specialist Conference, New Orleans, LA (2015).
142. “Non-ideal diode Response in CZTSe from Admittance Spectroscopy”, M. J. Koeper, C. J. Hages, C. K. Miskin, S. M. McLeod, X. Zhao, R. Zhang, J. V. Li, S. G. Choi, D. Levi, and R. Agrawal, Solar Future Symposium 2015, Solar & Photovoltaics Engineering Research Center, King Abdullah University of Science & Technology, Thuwal, Saudi Arabia, November 2015.
143. “Applying the Chemistry of Amine-Thiol Mixtures for Solution-Processed CdTe Thin Films”, C. Miskin, R. W. Boyne and R. Agrawal, AIChE Annual Meeting, Salt Lake City, UT, November, 2015.

144. “Solution-Processed Energy Harvesting Electronic Devices Using Amine-Thiol Solvent Media”, C. Miskin, K. Bock, R. W. Boyne and R. Agrawal, AIChE Annual Meeting, Salt Lake City, UT, November, 2015.
145. “Efficient Separation-Process Synthesis”, G. Madenoor Ramapriya, Z. Jiang, M. Tawarmalani and R. Agrawal, AIChE Annual Meeting, Salt Lake City, UT, November, 2015.
146. “A Heat & Mass Integration Approach to Reduce Capital and Operating Costs of a Distillation Configuration”, G. Madenoor Ramapriya, Z. Jiang, M. Tawarmalani and R. Agrawal, AIChE Annual Meeting, Salt Lake City, UT, November, 2015.
147. “Efficient Hydrogen Power Plant Design for Continuous Power Supply from Renewable Hydrogen”, E. Gençer and R. Agrawal, AIChE Annual Meeting, Salt Lake City, UT, November, 2015.
148. “Integrated Process Design for Efficient Solar Thermal Hydrogen and Power Production”, E. Gençer, M. Tawarmalani and R. Agrawal, AIChE Annual Meeting, Salt Lake City, UT, November, 2015.

INVITED LECTURES

1. "Use of Exergy in Synthesis of Large Nitrogen Generators", Seminar at the University of California at Los Angeles, California (1991).
2. "Multi-component Separation by Heat Integrated Distillation Columns", Seminar at the University of California at Davis, California (1991).
3. "Influence of Chemical Engineering Education at Delaware on my Career", a talk at the College of Engineering Centennial Celebration, University of Delaware, February 1993.
4. "Separation Devices for Gas Mixing", Seminar at the West Virginia University, Morgantown, WV (1994).
5. "Membrane Cascades for Gas Separation", Seminar at the University of Massachusetts, Amherst, MA (1996).
6. "Membrane Cascades for Gas Separation", Paper at the 41st Gordon Research Conference on Separation and Purification, Colby-Sayer College, New London, New Hampshire, August 5, 1998.
7. "Efficiency and Operability of Complex Column Arrangements for Ternary Distillation", E. I. Du Pont de Nemours and Company, March 1999.
8. "Hybrid Separation Processes" NSF Workshop, July 1999, Breckenridge, Colorado.
9. "New Configurations for Multi-component Distillation" University of Pennsylvania, April 2000.
10. "New Distillation Column Arrangements for Multi-component Separation", Auburn University, May 2000.
11. "Synthesis of Useful Membrane Cascades for Gas Separation", University of Notre Dame, October 2000.
12. "Some Recent Developments in Multi-component Distillation", Georgia Institute of Technology, January, 2001.
13. "Double-effect Distillation for Ternary Separations", Carnegie-Mellon University, March 2001.
14. "New Configurations for Multi-component Distillation" Symposium in honor of Professor Stanley I. Sandler, University of Delaware, April 2001.
15. "New Distillation Configurations for Multi-component Separations", Alkyl Amines, Padma Bhushan Professor B. D. Tilak Chemcon Distinguished Speaker, Chemcon-2001, Indian Institute of Chemical Engineers, December 2001.
16. "Synthesis of Useful Membrane Cascades for Gas Separation", University of Delaware, February 2002.

17. “Membrane Cascades for Gas Separation”, Lehigh University, February 2002.
18. “New Multi-component Distillation Column Arrangements”, Plenary Lecture, Process Modeling Center, Lehigh University, March 2002.
19. “Some Recent Developments in Multi-component Distillation”, *Bayer Lecture*, Carnegie-Mellon University, April 2002.
20. “Recent Developments in Multicomponent Distillation Configurations”, Purdue University, April 2003.
21. “Membrane Cascades with Limited Number of Recycle Compressors,” Sunoco, June, 2003
22. “Multicomponent Distillation Configurations,” Sunoco, June, 2003.
23. “The Hydrogen Economy: Opportunities, Costs, Barriers, and R&D Needs”, Regents Lecture, University of California, Los Angeles, CA, 2004.
24. “Hydrogen as an Energy Carrier – Its Promises and Challenges”, FOCAPD, Princeton, 2004.
25. “Hydrogen as an Energy Carrier – Its Promises and Challenges”, Distinguished Faculty Seminar: Advanced Power Sources, University of Michigan, Ann Arbor, 2004.
26. “Synthesis of Multicomponent Distillation Column Configurations”, City College, New York, 2004.
27. “Hydrogen As An Energy Carrier – Its Promises and Challenges”, Inaugural address in the Hydrogen seminar series at Purdue University, 2004.
28. “Synthesis of Multicomponent Distillation Column Configurations”, Keynote address at the joint IChE/AIChE conference in Mumbai, India 2004.
29. “Hydrogen As An Energy Carrier – Its Promises and Challenges”, Keynote address at the joint IChE/AIChE conference in Mumbai, India 2004.
30. “Energy-Some Challenges and Research Opportunities”, Invited talk in the Energy workshop at the joint IChE/AIChE conference in Mumbai, India 2004.
31. “Synthesis of Useful Membrane Cascades for Gas Separation”, Professor B. D. Tilak Visiting Fellowship lecture, Institute of Chemical Technology, University of Mumbai, India, 2004.
32. “Hydrogen As An Energy Carrier – Its Promises and Challenges”, Ohio State University, 2005.
33. “Hydrogen As An Energy Carrier – Its Promises and Challenges”, Opening Plenary Lecture, International Chemical Engineering Conference – VI, Tec de Monterrey, Mexico, 2005.
34. “Separation: Perspective of a Process developer/Designer”, Invited keynote lecture at the ACS Symposium, San Diego, CA, 2005.

35. "The Challenges in the Synthesis of Multicomponent Separation Configurations in Chemical Industry", Winthrop E. Stone Lecture, Purdue University, 2005.
36. "Hydrogen as an Energy Carrier – Its Promises and Challenges", Othmer Department of Chemical Sciences & Engineering, Polytechnic University, New York, 2005.
37. "Hydrogen as an Energy Carrier – Its Promises and Challenges", Clarkson University, Potsdam, NY, 2005.
38. "Synthesis of Multicomponent Distillation Column Configurations", Department of Chemical Engineering, Clarkson University, Potsdam, NY, 2005.
39. "Separation: Perspective of a Process developer/Designer", Invited keynote lecture at the China/USA/Japan Joint Chemical Engineering Conference, Beijing, China, October 2005.
40. "Energy Supply Challenges and Opportunities", Institute Lecture, AIChE Annual Meeting, Cincinnati, 2005.
41. "Hydrogen as an Energy Carrier – Its Promises and Challenges", Society of Automotive Engineers, Fort Wayne, IN, 2006.
42. "The Challenges in the Synthesis of Multicomponent Separation Configurations in Chemical Industry" University of Colorado, Boulder, Co., 2006
43. "Separation: Perspective of a Process developer/Designer", Department of Chemical Engineering, Tianjin University, Tianjin, China, May, 2006.
44. "Energy Supply Challenges and Opportunities", Peking University, Beijing, China, May 2006.
45. "Energy Supply Challenges and Opportunities", Department of Chemical Engineering, Tsinghua University, Beijing, China, May, 2006.
46. "Separation: Perspective of a Process developer/Designer", Department of Chemical Engineering, Tsinghua University, Beijing, China, May, 2006.
47. "Energy Supply Challenges and Opportunities for Chemical Engineers", Invited plenary lecture at the 4th Pacific Basin Conference on Adsorption Science and Technology, Tianjin, China, 2006.
48. "Energy Supply Challenges and Opportunities", Keynote lecture at Summit on Energy Sustainability, Texas Tech University, Lubbock, Tx, September, 2006.
49. "Environmentally Friendly Energy Solutions", Keynote lecture at Chemical Heritage Foundation Innovation Conference, Philadelphia, Pa, September, 2006.
50. "Environmentally Friendly Energy Solutions", Department of Chemical Engineering, Illinois Institute of Technology, Chicago, October, 2006.

51. "The Challenges in the Synthesis of Multicomponent Separation Configurations in Chemical Industry", Session in honor of Gerhold Award Winners, AIChE annual meeting, San Francisco, Nov. 2006.
52. "New Energy-Efficient and Low-Cost Multicomponent Distillation Configurations" Texas Technology Showcase, Galveston, TX, Dec. 2006.
53. "Environmentally Friendly Energy Solutions", NRC Board on Energy and Environmental Systems, Washington D.C., Dec. 2006.
54. "Separations: Perspective of a Process Developer/Designer", University Institute of Chemical Technology, Mumbai, India, Jan. 2007.
55. "The Challenges in the Synthesis of Multicomponent Separation Configurations in Chemical Industry", University Institute of Chemical Technology, Mumbai, India, Jan. 2007.
56. "Hydrogen as an Energy Carrier – Its promises and challenges", University Institute of Chemical Technology, Mumbai, India, Jan. 2007.
57. "Environmentally Friendly Energy Solutions", Shri M.V. Mariwala Visiting Professorship Lecture, University Institute of Chemical Technology, Mumbai, India, Jan. 2007.
58. "Use of Sustainable Hydrogen to Produce Liquid Biofuels", Keynote Lecture, Second Energy Center Hydrogen Initiative Symposium, Purdue University, April 2007.
59. "New Design Methods and Algorithms for Highly Energy-efficient and Low-cost Multicomponent Distillation Processes", Department of Energy, Houston, April, 2007.
60. "Environmentally Friendly Energy Solutions", Technology Day Lecture, Indian Institute of Petroleum, Dehradun, India, May 2007.
61. "The Challenges in the Synthesis of Multicomponent Separation Configurations in Chemical Industry", Dow Chemical Company, Midland, MI., May 2007.
62. "An Environmentally Friendly Novel Route for the Transportation Fuel", NETL, Pittsburgh, PA, May 2007.
63. "Environmentally Friendly Energy Solutions", Dow Chemical Company, Midland, MI., Sept. 2007.
64. "Environmentally Friendly Energy Solutions", Achievement Award Lecture, Industrial Research Institute, Lincolnshire, IL, Oct. 2007.
65. "Environmentally Friendly Energy Solutions", University of Southern California, Lyman Handy Colloquium Series Lecture, Los Angeles, CA, Dec. 2007.
66. "Development of Low-Cost CuInSe₂ Nanocrystal-Ink Based Solar Cells", Chemcon 2007, Kolkota, India, Dec. 2007.

67. “Environmentally Friendly Energy Solutions”, Dept. of Chemical Engineering and Material Science, University of Minnesota, Minneapolis, MN, Jan. 2008.
68. “Energy Saving Opportunities in Multicomponent Distillation: Optimum configuration and Thermal Coupling between Distillation Columns”, ExxonMobil, Annandale, NJ, Feb. 2008.
69. “Thermochemical Methods for Biofuel Production from Biomass”, 2008 AAAS Annual Meeting, Boston, MA, Feb. 2008.
70. “Energy Saving Opportunities in Multicomponent Distillation: Optimum Configuration and Thermal Coupling Between Distillation Columns”, Dow Chemical Company, Midland, MI, April 2008.
71. “Environmentally Friendly Transportation Fuels”, AIChE Fuels and Petrochemicals Division Award Lecture, New Orleans, LA, April 2008.
72. “Environmentally Friendly Energy Solutions”, Department of Chemical and Environmental Engineering, University of Arizona, Tucson, AZ, May 2008.
73. “Environmentally Friendly Energy Solutions”, Department of Chemical and Environmental Engineering, University of California, Riverside, CA, May 2008.
74. “Transportation Fuel in a Fossil Fuel Deprived World”, MPR Associates, Alexandria, VA, June 2008.
75. “Environmentally Friendly Energy Solutions”, Foundations of Computer-Aided Process Operations (FOCAPO), Boston, MA, July 2008.
76. “Energy Systems Analysis”, Pan American Institute (PASI) Workshop, Mar Del Plata, Argentina, August 2008. (*Voted as the best presentation by over 50 international graduate students attending the workshop*).
77. “Experimental Studies of Coal and Biomass Fuel Synthesis and Flame Characterization for Aircraft Engines”, Multi Agency Coordination Committee for Combustion Research (MACCCR) Fuels Research Review, Gaithersburg, MD, September 2008.
78. “Energy Solutions for a Fossil Fuel Deprived Future”, *Opening Plenary Lecture*, Schlinger Symposium, Chemical Heritage Foundation, Philadelphia, PA, September 2008.
79. “Energy Solutions for a Fossil Fuel Deprived Future”, *W. R. Marshall Founders’ Lecture*, Department of Chemical and Biological Engineering, University of Wisconsin, Madison, WI, September 2008.
80. “Energy Solutions for a Future Solar Economy” *Tis Lahiri Lecture*, Chemical and Biomolecular Engineering, Vanderbilt University, Nashville, TN, October 2008.
81. “Energy Solutions for a Fossil Fuel Deprived Future”, National Science Foundation, Arlington, VA, October 2008.

82. “Synergistic Processes to Produce Biofuels from Biomass”, C. Murthy Memorial Lecture, Indian Institute of Chemical Engineers, Chandigarh, India, Dec. 2008.
83. “Synergistic Processes to Produce Biofuels from Biomass”, Indian Institute of Petroleum, Dehradun, India, January 2009.
84. “Energy Solutions for a Fossil Fuel Deprived Future”, Andlinger Energy Lecture, Princeton University, Princeton, February, 2009.
85. “Transportation Fuel in a Fossil Fuel Free world”, Renewable Energy World 2009, Las Vegas, March 2009.
86. “Sustainable Energy Utilization and Transformation”, George W. Woodruff School of Mechanical Engineering’s Sustainable Energy Pathways and Solutions Workshop, Georgia Tech., Atlanta, April 2009.
87. “Synergistic Processes for Biofuels”, Purdue Biofuels Symposium, West Lafayette, In, May 2009.
88. “Transportation Fuel in a Solar Economy”, Keynote Lecture, FOCAPD, Breckenridge, Co, June 2009.
89. “Synergistic Processes for Biofuels”, Plenary Lunch Lecture, BioFuels Conference- The Next Generation of Biofuels, Mississippi State University, Jackson, Ms, August 2009.
90. “Energy Saving Opportunities in Distillation: Identification of Useful Configurations”, Keynote Lecture, 10th International Symposium on Process Systems Engineering, PSE 2009, Salvador, Bahia, Brazil, August 2009.
91. “Energy Solutions for a Fossil Fuel Deprived Future”, Pioneers in Energy Lecture, Purdue University, West Lafayette, IN, September 2009.
92. “Thin Film Solar Cells from Nanocrystal Inks of Quaternary Semiconductors”, GE Global Research, Niskayuna, NY, September 2009.
93. “Thin Film Solar Cells from Nanocrystal Inks of Quaternary Semiconductors”, Solar Workshop at CNM Users Meeting, Argonne National Laboratory, Chicago, IL, October 2009.
94. “More Liquid Fuel from Biomass”, Indo-US Workshop on Climate and Energy Futures, Chennai, India, October 2009.
95. “Transportation Fuel Solutions Using Renewable Energy”, RTI Fellows Symposium, RTI International, Research Triangle Park, NC, November 2009.
96. “A Future Solar Economy”, Invited Session Honoring Professor James Wei, AIChE Annual Meeting, Nashville, TN, November 2009.
97. “Solar Based Sustainable Energy Solutions”, Maddox Solar Energy Series, Whitacre College of Engineering at Texas Tech University, Lubbock, Tx, February, 2010.

98. "Role of Biomass to Liquid Fuel in a Solar Economy", C3Bio Meeting. Purdue University, West Lafayette, IN, May, 2010.
99. "Solar Based Sustainable Energy Solutions", Plenary Lecture, 2nd International Symposium on Sustainable Chemical Product and Process Design (ISSCPPE), Hangzhou, China, May, 2010
100. "Energy Savings in Distillation via Identification of Useful Configurations", V.H. Shah and R. Agrawal (given by VHS), A keynote lecture at Process Development Symposium (PDS), June 2010, Lake Ozark, MO
101. "Transportation Fuel Solutions using Renewable Energy", EPFL, Lausanne, Switzerland. Sept 2010
102. "Energy Saving Opportunities in Multicomponent Distillation: Optimum Configuration and Thermal Coupling between Distillation Columns", EPFL, Lausanne, Switzerland. Sept 2010
103. "Chemical Engineering in a Solar Energy Driven Sustainable Future", PPG Foundation Keynote Address, 32nd Annual Chemical Engineering Graduate Student Association Symposium, Carnegie Mellon University, Pittsburgh, PA, October, 2010
104. "Solar Based Sustainable Energy Solutions", Pirkey Lecture, University of Texas, Austin, Tx, Nov. 2010
105. "Solar Based Sustainable Energy Solutions", Invited keynote address, AIChE annual meeting, Salt Lake City, UT, Nov 2010.
106. "Energy Savings in Distillation via Identification of Useful Configurations", Invited talk in the Gerhold Award Plenary Session on Separations, AIChE Annual Meeting, Salt Lake City, UT, Nov. 2010
107. "Stan Sandler – A perfect Advisor and a Great Mentor", Invited talk in the Seventieth Birthday Session for Stan Sandler, AIChE Annual Meeting, Salt Lake City, UT, Nov 2010.
108. "Thin Film Solar Cells from Nanocrystal Inks of Quaternary Semiconductors", Helmholtz-Zentrum Berlin für Materialien und Energie, Berlin Nov. 2010
109. "Transportation Fuel Solutions Using Solar Energy" Helmholtz-Zentrum Berlin für Materialien und Energie, Berlin Feb. 2011
110. "Synthesis of Multicomponent Distillation Configurations and Solar Cells from Nanocrystal Inks of Quaternary Semiconductors", IIT Kanpur, India, March 2011
111. "Chemical Engineering in a Solar Energy Driven Sustainable Future", IIT Kanpur, March 2011
112. "Chemical Engineering in a Solar Energy Driven Sustainable Future", Hugh M. Hulburt Memorial Lecture, Northwestern University, Evanston, IL, April, 2011
113. "Thin Film Solar Cells From Nanocrystal Inks of Quaternary Semiconductors", Institute of Energy Conversion, University of Delaware, Newark, DE, May 2011

114. "Thin Film Solar Cells From Nanocrystal Inks of Quaternary Semiconductors", DuPont Experimental Station, Wilmington, DE, May 2011
115. "Energy Savings in Distillation via Identification of Useful Configurations", Technical Meeting of the European Federation of Chemical Engineering (EFCE) working party on Fluid Separations, Keble College, Oxford University, Oxford, UK, May 2011
116. "Chemical Engineering in a Solar Energy Driven Sustainable Future", Hess Lecture, Department of Chemical Engineering, University of Virginia, October 2011
117. "Novel Pathways for Biomass-to-Liquid Fuel Production", In session honoring Professor Santosh K. Gupta, AIChE annual meeting, Minneapolis, October 2011.
118. "Chemical Engineering Innovation Needs for a Future Solar Economy", Plenary Lecture, 61st Canadian Chemical Engineering Conference, London, Ontario, Canada, October 2011
119. "Novel Pathways for Biomass-to-Liquid Fuel Production", Plenary Lecture, 6th Sino/US joint conference, Beijing, China, Nov. 2011
120. "Thin Film Solar Cells from Nanocrystal Inks of Quaternary Semiconductors", Keynote Lecture, 6th Sino/US joint conference, Beijing, China, Nov. 2011
121. "Energy Savings in Distillation via Identification of Useful Configurations", Plenary Lecture, 6th Sino/US joint conference, Beijing, China, Nov. 2011
122. "Chemical Engineering Innovation Needs for a Future Solar Economy", National University of Singapore, Singapore, December 2011
123. "Thin Film Solar Cells from Nanocrystal Inks of Quaternary Semiconductors", National University of Singapore, Singapore, December 2011
124. "Energy Savings in Distillation via Identification of Useful Configurations", National University of Singapore, Singapore, December 2011
125. "Synthesis of Quaternary Semiconductor Nanocrystal Inks and Their Use for Fabrication of Solar Cells", Indo-US Workshop on photovoltaic science and technologies, IIT Bombay, India, January 2012
126. "Chemical Engineering in a Solar Driven Sustainable Future", Ken Nobe Founders Lecture in Chemical and Biomolecular Engineering, UCLA, February 2012
127. "A Systems Approach for The Use of Renewable Energy in Transportation", Pugwash, Purdue University, Feb. 2012
128. "Chemical Engineering in a Solar Driven Sustainable Future", Truth and Beauty Seminar Series, School of Chemical Engineering, Purdue University, March 2012

129. "Energy Savings in Distillation via Identification of Useful Configurations", E.V. Murphree Award in Industrial & Chemistry Symposium in honor of Michael F. Doherty, Session, ACS National Meeting, San Diego, March 2012.
130. "Solar Economy- Is It feasible", Indiana Academy of Science, West Lafayette, IN. March 2012.
131. "How Feasible is Renewable Energy", Callout Night Speaker, PugWash, Purdue University, August, 2012
132. "Thin Film Solar Cells from Nanocrystal Inks of Quaternary Chalcogenides", AVS Materials for Energy Meeting, University of Illinois at Urbana-Champaign, September, 2012
133. "Chemical Engineering in a Solar Energy Driven Sustainable Future", Department of Chemical Engineering, University of Pennsylvania, Sept., 2012
134. "Thin Film Solar Cells from Nanocrystal Inks of Quaternary Chalcogenides", Brookhaven National Lab, September, 2012
135. "Thin Film Solar Cells from Nanocrystal Inks of Quaternary Chalcogenides", Chemistry Department, University of Chicago, October 2012
136. "Thin Film Solar Cells from Nanocrystals of Quaternary Semiconductors", Joint symposium of Korean Institute of Chemical Engineering (KICChE) and AIChE to celebrate 50th anniversary of KICChE, AIChE Annual Meeting, Pittsburgh, October 2012.
137. "Sustainable Energy Research in Chemical Engineering", Joint US-India Symposium, AIChE Annual Meeting, Pittsburgh, October 2012.
138. "Nanocrystal Ink based route for Cu(In,Ga)Se₂ and Cu₂ZnSnS₄ Based Efficient Solar Cells", National University of Singapore, Singapore, December 2012.
139. "Thin Film Solar Cells from Nanocrystal Inks of Quaternary Chalcogenides", Plenary talk, 7th Singapore International Chemistry Conference (SICC-7), Singapore, December 2012.
140. "Energy Systems Analysis", Carbon Capture and Utilization Roadmap Agency of Singapore, Singapore, Dec. 2012.
141. "Novel Energy Efficient Distillation Configurations for Sustainable Era", Padmavibhushan Professor M. M. Sharma Lecture, Indian Institute of Chemical Engineers, Jalandhar, India, Dec. 2012.
142. "Direct Production of Molecules in the Fuel Range by Selective Tailoring of Biomass Fast" Indian Institute of Petroleum, Dehradun, January 2013.
143. "Thin Film Solar Cells from Nanocrystal Inks of Quaternary Chalcogenides", Indian Institute of Petroleum, Dehradun, January 2013.

144. "Thin Film Solar Cells from Nanoparticle Inks of Quaternary Chalcogenides", Inaugural lecture in the Photovoltaic Lecture series of the Birck Nanotechnology Center, Purdue University, January, 2013.
145. "CZTS and CZTGeS Solar Cells from Nanocrystal Inks", IBM/NREL CZTS meeting at IBM'S Watson Research Center, Yorktown Heights, NY, Jan. 2013.
146. "Sustainable Energy Research in Chemical Engineering", Arizona State University, Phoenix, AZ, Feb. 2013.
147. "Thin Film Solar Cells from Nanocrystal Inks of Quaternary Chalcogenides", Keynote Lecture, Colombia-US Workshop on Nanotechnology in Energy and Medical Applications, Medellin, Colombia, March 2013.
148. "Solar Cells from Nanocrystal Inks of Quaternary Chalcogenides", Keynote Lecture, Renewable Energy & Energy Efficiency Workshop, Louisville, March 2013.
149. "Limiting Efficiencies for Solar Thermal Conversion to Fuels", Keynote Lecture in Session Solar Energy and Solar Fuels, ACS Meeting, April, 2013.
150. "Solar Economy - Is it Feasible?", Plenary Lecture, Purdue-Mexico Workshop on Sustainability, Purdue University, April, 2013.
151. "Nanocrystal Ink based route for Thin Film Solar Cells of Quaternary Chalcogenides", Plenary Lecture, International Conference on Energy and Sustainability, Hangzhou, China, May 2013.
152. "A Sustainable Future", Energy Academy, Purdue University, June 2013.
153. "A Sustainable Future", SURF Seminar Series, Purdue University, July 2013.
154. "Nanocrystal Ink Based Route for Thin Film Solar Cells of Quaternary Chalcogenides", Keynote lecture, 3rd International Congress on Sustainability Science and Engineering (ICOSSE'13), Cincinnati, August 2013.
155. "Nanocrystal Ink Based Route For Quaternary Chalcogenides Solar Cells", Invited opening lecture, The 16th International Conference on II-VI Compound and Related Materials (II-VI 2013), Nagahama, Japan, September, 2013.
156. "Chemical Engineering for a Sustainable Energy Future", Chemical Engineering, University of Michigan, Ann Arbor, September 2013.
157. "Process Synthesis for Sustainable Energy Future", WebCAST series, The Computing and Systems Technology Division (CAST) of AIChE, October 2013.
158. "Process Engineering in Renewable Energy", Conference Plenary Lecture, XIV Congr s SFGP 2013, Lyon, France, October 2013.
159. "Energy Efficiency Improvement and Process Intensification for Multicomponent Distillation", DuPont Engineering, E. I. du Pont de Nemours and Company, Wilmington, DE, October 2013.

160. "Engineering a Sustainable Energy Future", Allan P. Colburn Honorary Lecture, DuPont Experimental Station, E. I. du Pont de Nemours and Company, Wilmington, DE, October 2013.
161. "Nanoparticle Ink based route for Efficient Thin Film Solar Cells", The 3rd Annual KAIST CBE Global Distinguished Lecture, Department of Chemical and Biomolecular Engineering, KAIST, Daejeon, Korea, Nov. 2013.
162. "Engineering a Sustainable Energy Future", The 3rd Annual KAIST CBE Global Distinguished Lecture, Department of Chemical and Biomolecular Engineering, KAIST, Daejeon, Korea, Nov. 2013.
163. "Energy Efficiency Improvement and Process Intensification for Multicomponent Distillation", ExxonMobil, Clinton, NJ, Nov. 2013.
164. "Engineering a Sustainable Energy Future", School of Chemical Engineering, Purdue University, West Lafayette, IN, Nov. 2013.
165. "Nanoparticle Ink based route for Efficient Thin Film Solar Cells", CHEMCON, Indian Institute of Chemical Engineers, Mumbai, India, Dec. 2013.
166. "Solar Energy- A key to a Sustainable Energy Future", Purdue President's Westwood Colloquia, West Lafayette, IN, Feb. 2014.
167. "Chemical Engineering for a Sustainable Energy Future", Opening Plenary Lecture, Midwest AIChE Meeting, Chicago, March 2014.
168. "Energy Efficiency Improvement and Process Intensification for Multicomponent Distillation", BP, Naperville, IL., March 2014.
169. "Engineering a Sustainable Energy Future - Biomass to Liquid Fuel", BP, Naperville, IL., March 2014.
170. "Nanoparticle Ink Based Route for Thin Film Solar Cells of Quaternary Chalcogenides", Center for Solar and Photovoltaic Engineering Research (SPERC) Workshop, King Abdullah University of Science and Technology (KAUST), Saudi Arabia, April, 2014
171. "Engineering a Sustainable Energy Future", US Patent and Trademark Office, Arlington, VA, May 2014.
172. "Engineering for a Sustainable Energy Future", Department of Chemical Engineering, University of California, Santa Barbara, CA, May, 2014.
173. "Welcome to SURF 2014", Lecture to Incoming SURF students at Purdue University, West Lafayette, IN, May 2014.
174. "Solar Energy: Some Challenges and Opportunities", Purdue Energy Academy, West Lafayette, IN, June, 2014.

175. "My Professional Journey as a Chemical Engineer", ExxonMobil, Clinton, NJ, August 2014.
176. "Energy Efficiency in Distillation", NRC Board on Chemical Science and Technology (BCST), Irvine, CA, August 2104.
177. "Nanoparticle Ink Based Route for Thin Film Solar Cells of Quaternary Chalcogenides", 19th International Conference on Ternary and Multinary Compounds, Nigata, Japan, September 2014.
178. "Engineering a Sustainable Energy Future", Agriculture and Biological Engineering, Purdue University, West Lafayette, IN, September, 2014
179. "Engineering A Sustainable Energy Future", Distinguished Lindsay Lecturer, Chemical Engineering, Texas A & M University, College Station, TX, September, 2014
180. "Engineering A Sustainable Energy Future", Professor C. V. Seshadri Memorial Distinguished Lecture, IIT Bombay, India, October, 2014
181. "Engineering A Sustainable Energy Future", Chemical Engineering, University of South Florida, Tampa, FL, October, 2014
182. "Chemical Engineering for Renewable Energy", Invited talk in the session honoring LS Fan for receiving Wilhelm Award, AIChE Annual Meeting, Atlanta, GA, November, 2014
183. "Engineering Solutions for Sustainable Energy: Photovoltaics", Sustainable Energy Plenary, AIChE Annual Meeting, Atlanta, GA, November, 2014
184. "Towards a Solar Economy", Texas Institute of Advanced Studies Eminent Scholar Lecture, Texas A&M, College Station, TX, December 2014.
185. "Engineering a Sustainable Energy Future", Chemical Engineering, Drexel University, Philadelphia, PA, February 2015
186. "Engineering a Sustainable Energy Future", Chemical Engineering, Iowa State University, Ames, Iowa, March 2015
187. "A Journey from Distillation to Solar Cells", Berkeley Lecture, Chemical Engineering, University of California, Berkeley, CA, March 2015
188. "Towards a Solar Economy" Berkeley Lecture, Chemical Engineering, University of California, Berkeley, CA, March 2015
189. "Engineering a Sustainable Energy Future", Schlumberger lecture, DB. Robinson lecture series, University of Alberta, Edmonton, Canada, April, 2015
190. "Synthesis of Energy Efficient Separation Processes Using Distillation and Membranes", Chemical Engineering, Texas A & M University, College Station, TX, April 2015
191. "Solar Energy: Some Challenges and Opportunities", Purdue Energy Academy, West Lafayette, IN, June, 2015.

192. “Towards a Solar Economy” Mechanical Engineering Department, Purdue University, West Lafayette, IN, September, 2015.
193. “Towards a Solar Economy” Chemical and Biomolecular Engineering Department, Columbia University, New York, NY, September, 2105.
194. “Engineering for a Sustainable Energy Future”, Plenary Lecture, ESCRE2015 – European Symposium on Chemical Reaction Engineering, Munich, October 2015.
195. “Solution Processed Inorganic Solar Cells”, Solar Future Symposium 2015, Solar & Photovoltaics Engineering Research Center, King Abdullah University of Science & Technology, Thuwal, Saudi Arabia, November 2015.
196. “Solution Processed Inorganic Solar Cells’, An invited talk in the plenary session of the Material Engineering and Sciences Division (MESD) of the AIChE, Salt Lake City, Nov. 2015.
197. “Synthesis of Energy Efficient Separation Processes Using Distillation and Membranes”, International Forum on Mass Transfer and Separation Engineering (IFMS2015), Tianjin University, Tianjin, China, Nov. 2015.
198. “Modeling for a Sustainable Energy Future”, Aspen Tech, Bradford, MA, Dec. 2015.
199. “Solution Processed Solar Cells”, Plenary Lecture, First international Conference on Advanced Materials for Power Engineering, ICAMPE 2015, Kottayam, India, Dec. 2015