

Prof. DEREK KEITH BAKER

Personal Information

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Education Information

Doctorate, The University of Texas at Austin, Mechanical Engineering, United States Of America 1996 - 2000

Postgraduate, The University of Texas at Austin, Mechanical Engineering, United States Of America 1994 - 1996

Undergraduate, Virginia Polytechnic Institute and State University, Mechanical Engineering, United States Of America 1987 - 1992

Dissertations

Doctorate, An investigation of calcium carbonate scaling rates based on experiments and modeling, The University Of Texas At Austin, Mechanical Engineering, 2000

Postgraduate, Software to predict scaling problems in solar hot water systems, The University Of Texas At Austin, Mechanical Engineering, 1996

Research Areas

Mechanical Engineering, Energy, Solar energy, Engineering and Technology

Academic Titles / Tasks

Professor, Middle East Technical University, Faculty Of Engineering, Department Of Mechanical Engineering, 2015 - Continues

Associate Professor, Middle East Technical University, Faculty Of Engineering, Department Of Mechanical Engineering, 2014 - 2015

Associate Professor, Middle East Technical University, Faculty Of Engineering, Department Of Mechanical Engineering, 2011 - 2012

Assistant Professor, Middle East Technical University, Faculty Of Engineering, Department Of Mechanical Engineering, 2003 - 2010

Assistant Professor, Humboldt State University, Natural Sciences, Environmental Systems Engineering, 2000 - 2003

Advising Theses

KAZANÇ ÖZERİNÇ F., BAKER D. K. , Hybridization of single flash geothermal power plant with biomass driven SCO₂ topping cycle, Postgraduate, B.Mutlu(Student), 2020

BAKER D. K. , Modelling and performance analysis of linear fresnel collector for process heat generation for Ice Cream Factory in Konya, Postgraduate, R.SINGH(Student), 2017

TARI İ., BAKER D. K. , Conceptual design and heat transfer investigation of a dense granular flow solar receiver,

Postgraduate, E.FAİR(Student), 2017

TARI İ., BAKER D. K. , Numerical comparison and sizing of sensible and latent thermal energy storage for compressed air energy storage, Postgraduate, M.KAYA(Student), 2015

BAKER D. K. , GÜVENÇ YAZICIOĞLU A., Design and modeling of a novel rectifier with ceramic hollow fiber membrane contactor for miniaturized absorption cooling devices, Postgraduate, O.ÖZKAN(Student), 2015

BAKER D. K. , Modelling and transient analysis of a hybrid liquid Desiccant cooling system, Postgraduate, A.KARSHENASS(Student), 2014

BAKER D. K. , Methodology to size large scale solar PV installations for institutions with unidirectional metering, Postgraduate, M.ARSALAN(Student), 2014

BAKER D. K. , Theoretical and experimental investigation on characteristics of adsorption cooling systems using advanced porous materials, Postgraduate, N.BONYADI(Student), 2014

GÜVENÇ YAZICIOĞLU A., BAKER D. K. , Modelling, transient simulation and parametric study of parabolic trough collector with thermal energy storage, Postgraduate, T.Akba(Student), 2014

GÜVENÇ YAZICIOĞLU A., BAKER D. K. , Modelling, transient simulations and parametric studies of parabolic trough collectors with thermal energy storage, Postgraduate, T.AKBA(Student), 2014

BAKER D. K. , Baker D., Energy optimal path planning of an unmanned solar powered aircraft, Postgraduate, E.Emre(Student), 2013

BAKER D. K. , Modeling and simulations of direct steam generation in concentrating solar power plants using parabolic trough collectors, Postgraduate, C.Uçkun(Student), 2013

BAKER D. K. , ÇALIŞKAN M., A methodology for designing tonpiz-type transducers, Postgraduate, K.Çepni(Student), 2011

BAKER D. K. , Numerical modeling and performance analysis of solar-powered ideal adsorption cooling systems, Postgraduate, O.Taylan(Student), 2010

BAKER D. K. , Baker D., Simulations of a large scale solar thermal power plant in Turkey using concentrating parabolic trough collectors, Postgraduate, Y.Usta(Student), 2010

BAKER D. K. , 2-d modeling of a proton exchange membrane fuel cell, Postgraduate, E.Ağar(Student), 2010

BAKER D. K. , Thermodynamic and economic analysis of a solar thermal powered adsorption cooling system, Postgraduate, D.Emre(Student), 2008

BAKER D. K. , Energy and exergy analyses of high school heating system, Postgraduate, M.Dilek(Student), 2007

Articles Published in Journals That Entered SCI, SSCI and AHCI Indexes

- I. **Modeling heat exchangers with an open source DEM-based code for granular flows**
Johnson E. F. , TARI İ., BAKER D. K.
SOLAR ENERGY, vol.228, pp.374-386, 2021 (Journal Indexed in SCI)
- II. **Development and analysis of the novel hybridization of a single-flash geothermal power plant with biomass driven sco2-steam rankine combined cycle**
Mutlu B., BAKER D. K. , KAZANÇ ÖZERİNÇ F.
Entropy, vol.23, no.6, 2021 (Journal Indexed in SCI)
- III. **Radiative heat transfer in the discrete element method using distance based approximations**
Johnson E. F. , TARI İ., BAKER D. K.
POWDER TECHNOLOGY, vol.380, pp.164-182, 2021 (Journal Indexed in SCI)
- IV. **Solar-thermal driven drying technologies for large-scale industrial applications: State of the art, gaps, and opportunities**
Kamfa I., Fluch J., Bartali R., Baker D.
INTERNATIONAL JOURNAL OF ENERGY RESEARCH, vol.44, no.13, pp.9864-9888, 2020 (Journal Indexed in SCI)
- V. **A Monte Carlo method to solve for radiative effective thermal conductivity for particle beds of various solid fractions and emissivities**
Johnson E., Tari İ., Baker D.
JOURNAL OF QUANTITATIVE SPECTROSCOPY & RADIATIVE TRANSFER, vol.250, 2020 (Journal Indexed in SCI)

- VI. **Modeling, transient simulations and parametric studies of parabolic trough collectors with thermal energy storage**
Akba T., Baker D., GÜVENÇ YAZICIOĞLU A.
SOLAR ENERGY, vol.199, pp.497-509, 2020 (Journal Indexed in SCI)
- VII. **An investigation of optimum PV and wind energy system capacities for alternate short and long-term energy storage sizing methodologies**
Al-Ghussain L., Taylan O., BAKER D. K.
INTERNATIONAL JOURNAL OF ENERGY RESEARCH, vol.43, no.1, pp.204-218, 2019 (Journal Indexed in SCI)
- VIII. **Sizing of Photovoltaic-Wind-Battery Hybrid System for a Mediterranean Island Community Based on Estimated and Measured Meteorological Data**
Sadati S. M. S. , Jahani E., Taylan O., BAKER D. K.
JOURNAL OF SOLAR ENERGY ENGINEERING-TRANSACTIONS OF THE ASME, vol.140, no.1, 2018 (Journal Indexed in SCI)
- IX. **Technoeconomic and exergy analysis of a solar geothermal hybrid electric power plant using a novel combined cycle**
Bonyadi N., Johnson E., BAKER D. K.
ENERGY CONVERSION AND MANAGEMENT, vol.156, pp.542-554, 2018 (Journal Indexed in SCI)
- X. **Numerical Analysis of Phase Change Material Characteristics Used in a Thermal Energy Storage Device**
Bonyadi N., Somek S. K. , Ozalevli C. C. , Baker D., TARI İ.
HEAT TRANSFER ENGINEERING, vol.39, no.3, pp.268-276, 2018 (Journal Indexed in SCI)
- XI. **Solar energy potentials in strategically located cities in Nigeria: Review, resource assessment and PV system design**
Okoye C. O. , Taylan O., BAKER D. K.
RENEWABLE & SUSTAINABLE ENERGY REVIEWS, vol.55, pp.550-566, 2016 (Journal Indexed in SCI)
- XII. **A study to incorporate renewable energy technologies into the power portfolio of Karachi, Pakistan**
Ali S. M. H. , Zuberi M. J. S. , Tariq M. A. , BAKER D. K. , Mohiuddin A.
RENEWABLE & SUSTAINABLE ENERGY REVIEWS, vol.47, pp.14-22, 2015 (Journal Indexed in SCI)
- XIII. **Energetic and economic performance analyses of photovoltaic, parabolic trough collector and wind energy systems for Multan, Pakistan**
Sadati S. M. S. , Qureshi F. U. , BAKER D. K.
RENEWABLE & SUSTAINABLE ENERGY REVIEWS, vol.47, pp.844-855, 2015 (Journal Indexed in SCI)
- XIV. **Modeling and simulations of a micro solar power system**
Pehlivanurk C., Ozkan O., BAKER D. K.
INTERNATIONAL JOURNAL OF ENERGY RESEARCH, vol.38, no.9, pp.1129-1144, 2014 (Journal Indexed in SCI)
- XV. **Two dimensional transient coupled analysis of a finned tube adsorbent bed for a thermal wave cycle**
ÇAĞLAR A., Yamali C., BAKER D. K.
INTERNATIONAL JOURNAL OF THERMAL SCIENCES, vol.73, pp.58-68, 2013 (Journal Indexed in SCI)
- XVI. **MEASUREMENT OF SOLAR RADIATION IN ANKARA, TURKEY**
Caglar A., Yamali C., BAKER D. K. , KAFTANOĞLU B.
ISI BILIMI VE TEKNIGI DERGISI-JOURNAL OF THERMAL SCIENCE AND TECHNOLOGY, vol.33, no.2, pp.135-142, 2013 (Journal Indexed in SCI)
- XVII. **Solar repowering of Soma-A thermal power plant**
YILMAZOĞLU M. Z. , DURMAZ A., BAKER D. K.
ENERGY CONVERSION AND MANAGEMENT, vol.64, pp.232-237, 2012 (Journal Indexed in SCI)
- XVIII. **A two-energy equation model for dynamic heat and mass transfer in an adsorbent bed using silica gel/water pair**
Solmus I., Rees D. A. S. , Yamali C., Baker D.
INTERNATIONAL JOURNAL OF HEAT AND MASS TRANSFER, vol.55, pp.5275-5288, 2012 (Journal Indexed in SCI)
- XIX. **COP trends for ideal thermal wave adsorption cooling cycles with enhancements**
Taylan O., BAKER D. K. , KAFTANOĞLU B.

INTERNATIONAL JOURNAL OF REFRIGERATION-REVUE INTERNATIONALE DU FROID, vol.35, no.3, pp.562-570, 2012 (Journal Indexed in SCI)

- XX. **Numerical investigation of coupled heat and mass transfer inside the adsorbent bed of an adsorption cooling unit**
Solmus I, Rees D. A. S. , Yamali C., Baker D., KAFTANOĞLU B.
INTERNATIONAL JOURNAL OF REFRIGERATION-REVUE INTERNATIONALE DU FROID, vol.35, no.3, pp.652-662, 2012 (Journal Indexed in SCI)
- XXI. **Experimental investigation of a natural zeolite-water adsorption cooling unit**
Solmus I, KAFTANOĞLU B., Yamali C., Baker D.
APPLIED ENERGY, vol.88, no.11, pp.4206-4213, 2011 (Journal Indexed in SCI)
- XXII. **MODELING OF BIPOLAR PLATES FOR PROTON EXCHANGE MEMBRANE FUEL CELLS**
Ekiz A., Camci T., Turkmen I., SANKIR M., USLU S., BAKER D. K. , Agar E.
JOURNAL OF THE FACULTY OF ENGINEERING AND ARCHITECTURE OF GAZI UNIVERSITY, vol.26, no.3, pp.591-605, 2011 (Journal Indexed in SCI)
- XXIII. **International Summer Engineering Program on fuel cells for undergraduate engineering students**
BAKER D. K. , Agar E.
INTERNATIONAL JOURNAL OF HYDROGEN ENERGY, vol.36, no.5, pp.3712-3725, 2011 (Journal Indexed in SCI)
- XXIV. **Adsorption properties of a natural zeolite-water pair for use in adsorption cooling cycles**
Solmus I, Yamali C., KAFTANOĞLU B., Baker D., Caglar A.
APPLIED ENERGY, vol.87, no.6, pp.2062-2067, 2010 (Journal Indexed in SCI)
- XXV. **Thermodynamic limits to thermal regeneration in adsorption cooling cycles**
BAKER D. K.
INTERNATIONAL JOURNAL OF REFRIGERATION-REVUE INTERNATIONALE DU FROID, vol.31, no.1, pp.55-64, 2008 (Journal Indexed in SCI)
- XXVI. **Predicted impact of collector and zeolite choice on the thermodynamic and economic performance of a solar-powered adsorption cooling system**
Baker D. K. , Kaftanoglu B.
EXPERIMENTAL HEAT TRANSFER, vol.20, no.2, pp.103-122, 2007 (Journal Indexed in SCI)
- XXVII. **Identifying and reducing scaling problems in solar hot water systems**
Baker D. K. , Vliet G.
JOURNAL OF SOLAR ENERGY ENGINEERING-TRANSACTIONS OF THE ASME, vol.125, no.1, pp.61-66, 2003 (Journal Indexed in SCI)
- XXVIII. **Designing solar hot water systems for scaling environments**
Baker D. K. , Vliet G.
JOURNAL OF SOLAR ENERGY ENGINEERING-TRANSACTIONS OF THE ASME, vol.123, no.1, pp.43-47, 2001 (Journal Indexed in SCI)

Articles Published in Other Journals

- I. **Normalized Thermodynamic Model for Intermittent Energy Systems and Application to Solar-Powered Adsorption Cooling Systems**
Taylan O., BAKER D. K. , Kaftanoglu B.
INTERNATIONAL JOURNAL OF THERMODYNAMICS, vol.14, no.3, pp.107-115, 2011 (Journal Indexed in ESCI)

Books & Book Chapters

- I. **Technical Study of a Hybrid Solar-Geothermal Power Plant and its Application to a Thermal Design Course**
BAKER D. K. , Özalevli C., Sömek K.

in: Progress in Clean Energy Volume 2 Novel Systems and Applications, Dincer, I., Colpan, C.O., Kizilkan, O., Ezan, M.A., Editor, Springer, Cham, pp.887-910, 2015

II. Modeling and Transient Simulations of 30 MW Solar Thermal Electric Power Plants in the Northeast Mediterranean Region

BİLYAZ S., Singh R., KARSHENASS A., BAKER D. K.

in: Progress in Clean Energy Volume 2 Novel Systems and Applications, Dincer, I., Colpan, C.O., Kizilkan, O., Ezan, M.A., Editor, Springer, Cham, pp.1099-1114, 2015

III. Technical Analysis of Hybrid Desiccant Cooling in a Mediterranean Climate

KARSHENASS A., BAKER D. K., YAMALI C., Singh R.

in: Progress in Clean Energy Volume 2 Novel Systems and Applications, Dincer, I., Colpan, C.O., Kizilkan, O., Ezan, M.A., Editor, Springer, Cham, pp.911-928, 2015

IV. Thermodynamics An Integrated Learning System

schmidt P., Ezekoye O., Howell J., BAKER D. K.

John Wiley & Sons, 2006

Refereed Congress / Symposium Publications in Proceedings

I. Water Sludge Drying: Modelling of a Solar Thermal Plant for a Solar Vacuum Dryer

Bartali R., BAYER Ö., Pınarlı D., Erdoğan S., Bolognese M., BAKER D. K., Praticò L., Crema L.

EuroSun 2020, 01 September 2020

II. Hybridization of a geothermal power plant with biomass driven sCO₂ cycle

Mutlu B., BAKER D. K., KAZANÇ ÖZERİNÇ F.

Eight European Conference on Renewable Energy Systems (ECRES2020), 24 - 25 August 2020

III. Development of View Factor Correlations for Modeling Thermal Radiation in Solid Particle Solar Receivers Using CFD-DEM

johnson e., BAKER D. K., TARI İ.

SolarPACES2018: Solar Power and Chemical Energy Systems, Morocco, Morocco, 2 - 05 October 2018

IV. Concentrating Solar Thermal: Global Trends and Opportunities in Turkey

BAKER D. K.

TÜBA-TOBB ETÜ one day Energy Conference, Ankara, Turkey, 11 September 2017

V. NUMERICAL COMPARISON AND SIZING OF SENSIBLE AND LATENT THERMAL ENERGY STORAGE FOR COMPRESSED AIR ENERGY STORAGE SYSTEMS

Kaya M., TARI İ., BAKER D. K.

ASME International Mechanical Engineering Congress and Exposition (IMECE2016), Arizona, United States Of America, 11 - 17 November 2016

VI. Proposal of a Novel Gravity-Fed, Particle-Filled Solar Receiver

JOHNSON E., Baker D., TARI İ.

22nd International Conference on Concentrating Solar Power and Chemical Energy Systems (SOLARPACES), Abu Dhabi, United Arab Emirates, 11 - 14 October 2016, vol.1850

VII. Study Case of Solar Thermal and Photovoltaic Heat Pump System for Different Cities in Turkey

Moia-Pol A., Pujol-Nadal R., Martinez-Moll V., Bonyadi N., Baker D.

11th ISES EuroSun Conference, Palma, Spain, 11 - 14 October 2016, pp.762-766

VIII. TECHNICAL FEASIBILITY STUDY OF A SOLAR GEOTHERMAL HYBRID ELECTRIC POWER PLANT USING A COMBINED CYCLE

bonyadi n., johnson e., BAKER D. K.

SolarPaces 2016 Conference, Abu Dhabi, United Arab Emirates, 11 - 14 October 2016

IX. Solar Thermal Electricity Overview Activities in Turkey and New METU GÜNAM Laboratory ODAK

BAKER D. K.

INTERNATIONAL WORKSHOP ON SPECIAL TOPICS ON POLYMERIC COMPOSITES, 24 - 26 February 2016

X. Experimental analysis of energy storage device using phase change material integrated with a milk

storage system

NIMA B., SOMEK S. K. , C CIHAN O., BAKER D. K. , TARI İ.

1st Thermal and Fluid Engineering Summer Conference, TFESC, New-York, United States Of America, 9 - 12 August 2015

- XI. **A methodology for designing tonpiliz type transducers**
çepni k, BAKER D. K. , ÇALIŞKAN M.
3rd International Conference and Exhibition on Underwater Acoustics, 21 - 26 June 2015
- XII. **Modeling of the rectifier of a mini absorption cooling device using ceramic hollow fiber membranes**
OZKAN O., GÜVENÇ YAZICIOĞLU A., BAKER D. K.
ASME-ATI-UIT 2015 - Thermal Energy Systems: Production, Storage, Utilization and the Environment, 17 - 20 May 2015
- XIII. **Numerical Analysis of Phase Change Material Characteristics in a Thermal Energy Storage Heat Exchanger**
NIMA B., SOMEK S. K. , OZALEVLI C. C. , BAKER D. K. , TARI İ.
ASME-ATI-UIT 2015 Conference on Thermal Energy Systems: Production, Storage, Utilization and the Environment, Napoli, Italy, 17 - 20 May 2015
- XIV. **Numerical analysis of phase change material characteristics used in a thermal energy storage device**
Bonyadi N., kazım s., Özalevli c., BAKER D. K. , TARI İ.
ASME-ATI-UIT 2015 Conference on Thermal Energy Systems: Production, Storage, Utilization and the Environment, 17 May - 20 August 2015
- XV. **EXPERIMENTAL INVESTIGATION OF SINGLE-PHASE LIQUID FLOW AND HEAT TRANSFER IN MULTIPORT MINICHANNELS**
Altinoz M., GÜVENÇ YAZICIOĞLU A., Baker D.
12th International Conference on Nanochannels, Microchannels and Minichannels (ICNMM), Illinois, United States Of America, 3 - 07 August 2014
- XVI. **Adsorbent Refrigerant Comparison for a Solar Powered Adsorption Cooling System using Seasonal Simulations**
TAYLAN O., BAKER D. K. , Kaftanoglu B.
10th REHVA (the Federation of European Heating and Air Conditioning Associations) World Congress (Clima 2010), Antalya, Turkey, 9 - 12 May 2010
- XVII. **Parametric Study and Seasonal Simulations of a Solar Powered Adsorption Cooling System**
TAYLAN O., BAKER D. K. , Kaftanoglu B.
22nd International Conference on Efficiency, Cost, Optimization, Simulation and Environmental Impact of Energy Systems (ECOS 2009), Foz do Iguaçu, Brazil, 30 August - 03 September 2009, pp.833-842
- XVIII. **TRENDS IN COP FOR ADSORPTION COOLING CYCLES WITH THERMAL REGENERATION AND FINITE NUMBER OF BEDS**
BAKER D. K. , Kaftanoglu B.
2nd International Conference on Energy Sustainability, Florida, United States Of America, 10 - 14 August 2008, pp.601-608
- XIX. **ThermoNet: Part of an integrated website-textbook system**
Baker D., Canlidinc A.
International Conference on Education and Information Systems - Technologies and Application, Florida, United States Of America, 21 - 25 July 2004, pp.199-204

Supported Projects

BAKER D. K. , CB Strateji ve Bütçe Başkanlığı (Kalkınma Bakanlığı) Projesi, GÜNAM Expansion project, 2014 - Continues

Baker D. K. , Kale N., Kazanç Özerinç F., H2020 Project, GEOSMART, 2019 - 2023

Baker D. K. , Tari I., Okutucu Özyurt H. T. , Akata Kurç B., Çulfaz Emecen P. Z. , Kurt Z., Erden Topal Y., H2020 Project, SolarTwins: Solar Twinning to Create Solar Research Twins, 2020 - 2022

Baker D. K. , Bial M., Erden Topal Y., Erdil E., Pamukcu M. T. , Akçomak I. S. , Aydinođlu A. U. , H2020 Project, HORIZON-STE: Implementation of the Initiative for Global Leadership in Solar Thermal Electricity, 2019 - 2022

Baker D. K. , Sanchez R., Tari I., H2020 Project, Solar Facilities for the European Research Area - Third Phase, 2019 - 2022

Bayer ., Tari I., Baker D. K. , Nitz P., H2020 Project, INSHIP: Integrating National Research Agendas on Solar Heat for Industrial Processes, 2017 - 2020

Turan R., Baker D. K. , Okutucu zyurt H. T. , Tari ., Gven Yazıcıođlu A., CB Strateji ve Bte Bařkanlıđı (Kalkınma Bakanlıđı) Projesi, 2015K121200 - GNAM 2. Ařama Global Mkemmeliyet ve Sanayi AraYz Oluřturulması, 2015 - 2020

Turan R., Baker D. K. , Okutucu zyurt H. T. , EU Framework Program Project, EU-Solaris, The European Solar Research Infrastructure for Concentrated Solar Power, 2012 - 2016

Citations

Total Citations (WOS):480

h-index (WOS):13