



Dr. M. BALAGANESH

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Objective

Passion for teaching, and research. Organized and driven with impressive list of achievements and history of excelling in high-pressure environments. Skilled at applying various learning methods and tools to optimize student experience and academic journey.

Education

Degree	University/Board	Year
Ph.D.	Indian Institute of Technology Madras, Tamilnadu	2010-2015
M.Sc.	Madurai Kamaraj University, Madurai, Tamilnadu	2007-2009
B.Sc.		2004-2007

Achievements

- Qualified All India level Graduate Aptitude Test for Engineers (GATE)-2009.
- Qualified Joint CSIR-UGC Test for Eligibility for Lectureship (NET)-2009.

Employment

Institution	From	To	Post held
Central University of Rajasthan	25-05-2026	Till date	Assistant Professor
Pondicherry University	13-11-2024	04-05-2026	Guest Faculty
National Taiwan University	05-09-2016	26-07-2024	Post-doctoral fellow
Central University of Karnataka	19-10-2015	15-04-2016	Assistant Professor

Publications

1. Yang, S.C., **Balaganesh, M.**, Chang, J.W., Tsai, M.D., Wang, Y.C., Li, Y.P. and Kung, C.W., (2024). Support effect in metal–organic framework-derived copper-based electrocatalysts facilitating the reduction of nitrate to ammonia. *Electrochimica Acta*, 144348.
2. Dash, M. R., **Balaganesh, M.**, and Mishra, S. S. (2024) “Formation of alkoxymethyl hydroperoxides and alkyl formates from simplest Criegee intermediate (CH₂OO) + ROH (R= CH₃, CH₃CH₂, and (CH₃)₂CH) reaction systems.” *Theoretical Chemistry Accounts*, **143**, 29.
3. Chen, G. Y., Lin, Y. H., Fu, C. H., Lin, C. H., **Balaganesh, M.**, Espulgar, W. V., and Kasai, T. (2024) “Quantification of peracetic acid (PAA) in the H₂O₂+ acetic acid reaction by the wavelength shift analysis in near-UV/visible absorption region.” *Analytical Sciences*, 489-499.
4. Yu, H.Y., **Balaganesh, M.**, Li, S.C., Yu, W.Y. and Li, Y.P., (2023) “Surface characterization of cerium oxide catalysts using deep learning with infrared spectroscopy of CO.” *Materials Today Sustainability*, **24**, 100534.
5. **Balaganesh, M.**, Li, S.C. and Li, Y.P., (2023). “Developing machine learning models for accurate prediction of radiative efficiency of greenhouse gases.” *Journal of the Taiwan Institute of Chemical Engineers*, **151**,105123.
6. Fu, C.H., Chen, G.Y., Lin, Y.H., Lin, C.H., **Balaganesh, M.**, Kasai, T., Morita, K., Mito, H., Espulgar, W., Santos, G.N. and Yu, D.E., (2023) “Kinetic and equilibrium analysis of peracetic acid formation at 1753 cm⁻¹ mid-infrared absorption peak using facile attenuated total reflection Fourier transform Infrared technique.” *Journal of the Chinese Chemical Society*, **70**, 1427-1434.
7. Che, D.C., Kawamata, H., Nakamura, M., Tso, C.J., **Balaganesh, M.** and Kasai, T., (2023). “Concerted stereodynamics of chemical changes: The branching selectivity in the photodissociation of asymmetric-top molecules, formic acid, and the cold reactivity of the H+ H₂ exchange reaction.” *Journal of the Chinese Chemical Society*, **70**, 1297-1313.
8. Kasai, T., Verma, S., **Balaganesh, M.**, Chang, H.P. and Mori, J., (2023) “Characterization of ablation conditions with the grayscale representation for Nd: YAG laser to decolor the blue-ink on marble stone surface: Decoloration dependency on the laser flux power, wavelength, and the water spraying.” *Journal of the Chinese Chemical Society*, **70**, 1417-1426.
9. Cheng, Y., Ding, C., Wang, H., Zhang, T., Wang, R., **Balaganesh, M.**, Xu, H. and Zhang, Q., (2023). “Significant influence of water molecule on the SO₃+ HCl reaction in the gas phase and at the air-water interface.” *Physical Chemistry Chemical Physics*, **25**, 28885-28894.
10. Mu, R., Zhou, W., Hong, Z., Wang, R., Liu, Q., Zhang, Q., Jiang, M., **Balaganesh, M.**, and Zhang, T., (2023) “A possible atmospheric source of HNO₃: the ammonolysis reaction of t-N₂O₄ in the presence of water monomer, water dimer, and sulfuric acid.” *Environmental Science: Atmospheres*, **3**, 1407-1417.
11. Ali, M.A. and **Balaganesh, M.**, (2023) “Effect of formic acid on O₂+ OH·CHOH→ HCOOH+ HO₂ reaction under tropospheric condition: kinetics of cis and trans isomers”. *Physical Chemistry Chemical Physics*, **25**, 9965-9978.
12. Kasai, T., **Balaganesh, M.**, Po, X.H., Yan, C.C., Lin, K.C., Tanudji, J. and Diño, W.A., (2022). “Pattern analysis of the impact-parameter dependent trajectories for the H+H₂ exchange reaction at T= 3 and 300 K: A characteristic propensity for reactive versus nonreactive trajectories found in the time-dependent interaction potential and a roaming-like libration motion at cold temperature”. *Journal of the Chinese Chemical Society*, **69**, 630-645.
13. Ali, M. A., and **Balaganesh, M.**, (2022) “Effect of Water and Formic Acid on OH + CH₄ Reaction: An *Ab Initio*/DFT Study” *Catalysts* **12**, 133.

14. Zhang, Y., Cheng Y., Zhang, T., Wang, R., Ji, J., Xia, Y., Lily, M., Wang Z., and **Balaganesh, M.**, (2022) “A computational study of the $\text{HO}_2 + \text{SO}_3 \rightarrow \text{HOSO}_2 + 3\text{O}_2$ reaction catalyzed by water monomer, water dimer and small clusters of sulfuric acid: kinetics and atmospheric implications” *Physical Chemistry Chemical Physics*, **24**, 18205-18216.
15. Zhang, T., Zhang, Y., Tian, S., Zhou, M., Liu, D., Lin, L., Zhang, Q., Wang, R. and **Balaganesh, M.***, (2022). “Possible atmospheric source of $\text{NH}_2\text{SO}_3\text{H}$: the hydrolysis of HNSO_2 in the presence of neutral, basic, and acidic catalysts” *Physical Chemistry Chemical Physics*, **24**, 4966-4977.
16. Dash, M. R., **Balaganesh, M.**, Subhashree S. M., Balakumaran A., and Lin, K.C., (2021) “Kinetic insights into ethynyl radical with isobutane and neopentane.” *Theoretical Chemistry Accounts* **140**, 1-9.
17. Rajakumar, B., Parandaman, A., and **Balaganesh, M.** (2021) “Thermal Decomposition of 2-Methyltetrahydrofuran behind Reflected Shock Waves over the Temperature Range of 1179–1361 K.” *The Journal of Physical Chemistry A*. **125**, 5406–5422.
18. Ali, M.A., **Balaganesh, M.**, Al-Odaïl, F.A. and Lin, K.C. (2021) “Effect of ammonia and water molecule on $\text{OH} + \text{CH}_3\text{OH}$ reaction under tropospheric condition”. *Scientific Reports*, **11**, 12185.
19. Lily, M., Hynniewta, S., **Balaganesh, M.**, Wang, W., Chandra, A.K. and Liu, F. (2021). “Quantum chemical insights into the atmospheric reactions of $\text{CH}_2\text{FCH}_2\text{OH}$ with OH radical, fate of $\text{CH}_2\text{FC}\cdot$ HOH radical and ozone formation potential.” *Atmospheric Environment*, **249**, 118247.
20. Lin, K. C., **Balaganesh, M.**, Chang, H. P., Kasai, T., and Chang, Y. P. (2021). “Halogen-related photodissociation in atmosphere: characterization of atomic halogen, molecular halogen, and hydrogen halide.” *International Reviews in Physical Chemistry*, **40**, 1-50.
21. **Balaganesh, M.**, Kasai, T. and Lin, K.C. (2021). “Probing BrCl from photodissociation of CH_2BrCl and CHBr_2Cl at 248 nm using cavity ring-down spectroscopy”. *Physical Chemistry Chemical Physics*, **23**, 6098-6106.
22. Wang, R., Mingjie, W., Shuai, L., Yousong, L., Lily, M., **Balaganesh, M.***, Tianlei, Z., Zhiyin, W., and Zhuqing, W. (2021) “The favorable routes for the hydrolysis of CH_2OO with $(\text{H}_2\text{O})_n$ ($n= 1-4$) investigated by global minimum searching combined with quantum chemical methods.” *Physical Chemistry Chemical Physics* **23**, 12749-12760.
23. **Balaganesh, M.**, Joseph, S., Kasai, T., and Lin, K.C., (2021) “Photodissociation of $\text{CH}_2\text{BrCHBrC}(\text{O})\text{Cl}$ at 248 nm : Probing Br_2 as Primary Fragment by Cavity Ring-Down Spectroscopy.” *Physical Chemistry Chemical Physics*. **23**, 22492-22500.
24. Wen, M., Cao, X., Zhang, Y., Liang, M., Zhang, T., **Balaganesh, M.**, Zhou, K., Roy, S. K. and Lily, M. (2020). “Effect of ammonia, ammonia-water, and sulfuric acid on the $\text{HO}_2 + \text{HO}_2 \rightarrow \text{H}_2\text{O}_2 + 3\text{O}_2$ reaction in troposphere: Competition between stepwise and one-step mechanisms.” *International Journal of Quantum Chemistry*, e26389.
25. Ali, M. A., **Balaganesh, M.**, and Jang, S. (2019). “Can a single water molecule catalyze the $\text{OH} + \text{CH}_2\text{CH}_2$ and $\text{OH} + \text{CH}_2\text{O}$ reactions?” *Atmospheric Environment*, **207**, 82-92.
26. **Balaganesh, M.**, Paredes-Roibás, D., Kasai, T., and Lin, K.C., (2019) “Photodissociation of CH_2BrI Using Cavity Ring-down Spectroscopy: in Search of BrI Elimination Channel”. *Physical Chemistry Chemical Physics*, **21**, 13943-13949.
27. Paredes-Roibás, D., **Balaganesh, M.**, Kasai, T., Gavira-Vallejo, J.M. and Lin, K.C., (2018). “Cavity Ring-Down Absorption Spectroscopy: Optical Characterization of ICl Product in Photodissociation of CH_2ICl at 248 nm.” *The Journal of Physical Chemistry A*, **122**, 8344-8353.
28. Kasai, T., Che, D. C., Tsai, P. Y., Nakamura, M., **Balaganesh, M.**, and Lin, K. C. (2018) “Roaming and chaotic behaviors in collisional and photo-initiated molecular-beam reactions: a role of classical vs. quantum nonadiabatic dynamics” *Rendiconti Lincei. Scienze Fisiche e Naturali*. **29**, 219–232.

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29. Ali, M. A., **Balaganesh, M.**, and Lin, K. C. (2018) "Catalytic Effect of a Single Water Molecule on the OH+ CH₂NH Reaction." *Physical Chemistry Chemical Physics* **20**, 4297-4307.
 30. Rajakumar, B., **Balaganesh, M.**, and Parandaman, A., (2017) "Experimental and RRKM Investigations on the Degradation of Ethyl Formate." *Chemistry Select* **2**, 11603-11614.
 31. Bourgalais, J., Jamal-Eddine, N., Joalland, B., Capron, M., **Balaganesh, M.**, Guillemin, J.C., Le AQPicard, S.D., Faure, A., Carles, S. and Biennier, L., (2016) "Elusive anion growth in Titan's atmosphere: low temperature kinetics of the C₃N + HC₃N reaction" *Icarus*, **271**, 194–201.
 32. Parandaman, A., **Balaganesh, M.**, and Rajakumar, B., (2015) "Experimental and theoretical study on thermal decomposition of methyl butanoate behind reflected shock waves." *RSC adv.*, **5**, 8653686550.
 33. **Balaganesh, M.**, Dash, M. R., and Rajakumar, B., (2014) "Experimental and Computational Investigation on the Gas Phase Reaction of Ethyl Formate with Cl Atoms." *J. Phys. Chem. A* **118**, 5272-5278.
 34. Dash, M. R., **Balaganesh, M.**, and Rajakumar, B., (2014) "Rate coefficients for the gas-phase reaction of OH radical with α -Pinene: An experimental and computational study" *Mol. Phys.* **112**, 1495-1511.
 35. **Balaganesh, M.**, and Rajakumar, B., (2014) "Mechanism, Kinetics and Atmospheric fate of CF₃CH=CH₂, CF₃CF=CH₂, and CF₃CF=CF₂ by its reaction with OH-radicals: CVT/SCT/ISPE and hybrid meta-DFT methods." *J. Mol. Graphics Modell.* **48**, 60-69.
 36. **Balaganesh, M.**, and Rajakumar, B., (2012) "Rate Coefficients and Reaction Mechanism for the Reaction of OH Radicals with (E)-CF₃CH=CHF, (Z)-CF₃CH=CHF, (E)-CF₃CF=CHF, and (Z)CF₃CF=CHF between 200 and 400 K: Hybrid Density Functional Theory and Canonical Variational Transition State Theory Calculations." *J. Phys. Chem. A*, **116**, 9832-9842.

Book Chapters and Proceedings

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1. Kasai, T., Lin, K.C., Tsai, P.Y., Nakamura, M., Che, D.C., Palazzetti, F., **Balaganesh, M.**, Che, D.C., Lin, K.C., Tsai, P.Y. and Nakamura, M., (2022) "Chemical Reaction Kinetics and Dynamics Re-Considered: Exploring Quantum Stereodynamics—From Line to Plane Reaction Pathways and Concerted Interactions." *Quantum Science: The Frontier of Physics and Chemistry*, 67-156.
 2. **Balaganesh, M.**, Sudhakar, G., Rajakumar, B. Thermal Decomposition of Ethyl Formate behind the Reflected Shock Waves in the Temperature Range of 909-1258K. *29th International Symposium on Shock Waves* 1, 01/2015: pages 233-238; ISBN: 978-3-319-16834-0, DOI:10.1007/978-3-319-16835-7_35.
 3. Denís Paredes-Roibás, **Balaganesh, M.**, Toshio Kasai, J. M. Gavira-Vallejo, King-Chuen Lin: ICl molecular elimination in photolysis of CH₂ICl at 248 nm by using cavity ring-down absorption spectroscopy. *EURASACAT Final Meeting Hong Kong 2018*.
 4. Toshio Kasai, **Balaganesh, M.**, King-Chuen Lin: Role of cooperative network interaction in transition region of roaming reactions: Non-equilibrium steady state vs. thermal equilibrium reaction scheme. *Proceedings of the international conference of computational methods in sciences and engineering 2017 (iccmse-2017)*; 11/2017, DOI:10.1063/1.5012288.
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Conferences

1. **Balaganesh, M.**, Yi-Pei Li “Machine learning and quantum mechanical approaches for high-throughput virtual screening of single-atom alloy (SAA) catalysts for electrocatalytic nitrate reduction reaction (NO₃RR)” in *Taiwan International Conference on Catalysis (TICC-2024)* at Catalysis Society of Taiwan, June 19-21, **2024**.
 2. **Balaganesh, M.**, Rajakumar, B. “Experimental and Computational Investigation on the Gas Phase Reaction of Ethyl Formate with Cl Atoms.” in *13th Eurasia Conference on Chemical Sciences* at IISc, Bangalore, India, December 14-18, **2014**.
 3. **Balaganesh, M.**, Rajakumar, B. “Thermal decomposition of ethyl formate behind the reflected shock waves over the temperature range of 909-1258K”. Oral presentation at *Chemistry In-House Symposium (CiHS-2014)*, at IIT Madras, Chennai, August 21st, **2014**.
 4. **Balaganesh, M.**, Rajakumar, B. “Thermal decomposition of Ethyl formate behind the reflected shock waves in the temperature range of 909-1258K.” Poster presentation at *29th International Symposium on Shockwaves* at Madison, Wisconsin, USA, July 14-19, **2013**.
 5. **Balaganesh, M.**, Rajakumar, B. “Kinetics, mechanisms and atmospheric fate of CF₃CH=CH₂ and CF₃CF=CF₂ by its reaction with OH radicals”. Poster presentation at *Discussion Meeting on Spectroscopy and Dynamics of Molecules and Clusters (SDMC-2013)*, at Udaipur, Rajasthan, February 21-24, **2013**.
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