Dr. RAMYA C. B.

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Current Affiliation: Research Associate at *Space Physics Laboratory (ISRO)*, Thiruvananthapuram, **India.**

Educational Qualifications:

- **PDF – Atmospheric Chemistry of Volatile Organic Compounds** (**Jan-2019 to July-2019**) **at** *Indian Institute of Technology Madras,* **Chennai.**
- **Ph.D. in Physical Chemistry with specialization in Atmospheric Chemistry (2014-2019) at** *Indian Institute of Technology Madras,* **Chennai.**
  Title of the Thesis: Cl Atom and OH Radical Initiated Photo Oxidation Reaction Kinetics and Mechanistic of Saturated, Unsaturated, Cyclic and Non-Cyclic Hydrocarbons.
  Research Supervisor: **Prof B. Rajakumar**
- **M.Sc. (Applied Chemistry)** from *S.N. College Nattika* (University of Calicut), Kerala, India (**First Class**)
- **PGDCA** (American Central University, ICDL), Kerala, India (**First Class**).
- **B.Sc. (Chemistry with Physics and Mathematics)** from *Little Flower College, Guruvayoor* (Calicut University), Kerala, India (**First Class).**

Research Skills:

- Kinetic and mechanistic studies for atmospherically relevant reactions using Relative- Rate (RR) technique as well as Coupled Cluster methods along with DFT and *ab- initio*.
- Acquired hands on experience during PhD on advanced instruments such as Lasers, Gas Chromatography (GC), FT-IR, GC-MS, GC-IR and LC-QTOF Techniques.
- Acquired hands on experience during MSc. Project on advanced instruments such as HPLC, NMR and UV-Visible spectroscopy.

- Softwares and programmes: C, C^{++}, Oracle, Visual Basic, MS OFFICE, Igor, Origin, Chemcraft, Chemdraw, Gaussian, Polyrate and Gaussrate.
- Operating systems: Windows and DOS.
- Acquired good theoretical and practical knowledge of Transition State Theory (TST) and Variational Transition State Theory (VTST) computational calculations for the reaction kinetics using Gaussian 09 package and Polyrate programme.

WORK EXPERIENCE:

- Worked as a Guest Lecturer from June 2009 to 2012 (Sree Krishna College, Guruvayoor, Affiliated to Calicut University)
- Worked as a teaching assistant for "Chemistry Theory and Laboratory" course for B. Tech 1st Year as well as "PG-Laboratory" (Physical Chemistry) during 2015 to 2018.
- Worked as a co-guide for "MSc. Project students and Summer Interns" during 2014 to 2019.
- Worked as a project officer for MHRD, DTH – phase II (2019)

PROJECT EXPERIENCE AT NIIST, TRIVANDRUM:

I undergone research-oriented project work titled "***"Isolation and Characterization of Compounds from 'Njavara' – the Medicinal Rice of Kerala"*** for the duration of six months under the guidance of Dr A. Jayalekshmi, Scientist F at the Organic Chemistry Division of Regional Research Laboratory (CSIR), Trivandrum- 19, India.

ACADEMIC ACHIEVEMENTS:

- Rewarded pre-doctoral fellowship by IIT-Madras, India (2019).
- GATE-2014.
- Selected for summer project by CSIR-NIIST, Trivandrum (2009).
- Got all India 6th rank in DAT (Direct Admission Test) Common Entrance Test in 2010 (Calicut University).
- Best reader award (BSc., Little flower college, Guruvayoor).
- Rewarded cash prize for school first in SSC.
- Rewarded KSICL scholarships.

RESEARCH PUBLICATIONS

(1) C. B. Ramya and B. Rajakumar, Cl-initiated photo-oxidation reactions of methyl propionate in atmospheric condition. *Env. Sci. Pollut. Res.* 2018, 25, 20999-21010.

(2) C. B. Ramya and B. Rajakumar, Photo Oxidation Reaction Kinetics of Ethyl Propionate with Cl Atom and Formation of Propionic Acid. *J. Phys. Chem. A* 2018, 122, 8274−8285.

(3) C. B. Ramya and B. Rajakumar, Kinetic investigations on the Cl atom and OH radical photo-oxidization reactions of 4H2BN in troposphere. *J. Phys. Chem. A* 2019,123, 20, 4342-4353.

(4) C. B. Ramya and B. Rajakumar, Cl initiated Tropospheric chemistry of Ethyl butyrate. *Chem. Phys. Lett.* 2019, 731, 136594.

(5) C. B. Ramya and B. Rajakumar, Cl atom Initiated Atmospheric Degradation of Saturated cyclic Hydrocarbons- Kinetic and Mechanistic investigation. *J. Phys. Chem. A* 2019, 123, 7361−7373.

(6) S. Vijayakumar, **C. B. Ramya,** Avinash Kumar, and B. Rajakumar, Kinetic investigations of Cl atom-initiated photo-oxidation reactions of cyclic unsaturated hydrocarbons in the gas phase: an experimental and theoretical study. *New J. Chem.* 2017, 41, 7491-7505.

(7) C. B. Ramya and B. Rajakumar, Kinetic investigations and formation of carbonyl compounds from methyl butyrate reactions with Cl atom and OH radical. (*Manuscript Under revision).*

(8) C. B. Ramya and B. Rajakumar, Cl atom-initiated studies on the kinetics of Ethyl tiglate in the Troposphere (*Manuscript under revision*).

(9) B. Rajakumar, G.Srinivasulu, **C. B. Ramya** and S. Vijayakumar, Kinetic investigations of 1,1,1,3,3,3-hexafluoro-2-methyl-2-propanol (HF2M2P) with OH radicals and Cl atoms. (*Manuscript submitted*).

POSTERS PRESENTED IN CONFERENCES AND SYMPOSIA

(1) C. B. Ramya and B. Rajakumar, "Experimental and Computational Studies on Kinetics of Cl atoms with Methyl propionate" presented a poster in **International symposium on Gas kinetics and related phenomena held in York, UK from 17th July to 23rd July, 2016.**

(2) C. B. Ramya and B. Rajakumar, "Photo-oxidation Reaction Kinetics of Cl atoms with Methyl propionate" An Experimental and Theoretical study" poster presented in Spectroscopy **and Dynamics of Molecules and Clusters (SDMC-2016) held in Pondicherry, India from 16th to 19th February, 2017.**

(3) C. B. Ramya and B. Rajakumar, "Kinetics and mechanistic studies for the Formation of Carbonyl Compounds on reaction of Cl atoms with series of esters" presented a poster in **Chemistry In-House Symposium on 28th September, 2018.**

(4) S. Vijayakumar, **C.B. Ramya** and B. Rajakumar, "Kinetic investigations for chlorine atom-initiated reaction with trans-2-butene in troposphere; An Experimental and computational study" presented a poster in **TSRP-APSRC-2016 at BARC, Mumbai, India from January 5-9, 2016.**

(5) S. Vijayakumar, **C.B. Ramya** and B. Rajakumar, "Kinetic investigations for chlorine atom-initiated reaction with trans-2-butene in troposphere; An Experimental and computational study" presented a poster in Chemistry **In-House Symposium held in IIT Madras, Chennai, India on**

15th August, 2015.

(6) C. B. Ramya and **B. Rajakumar**, "Cl atom-initiated photo-oxidation reaction kinetics of methyl and ethyl propionate" **International symposium on Gas kinetics and related phenomena held in Lille, France from 22nd July to 26th July, 2018 (Invited Talk).**

(7) C. B. Ramya and B. Rajakumar, "Tropospheric photo-oxidation reaction kinetics of carbonyl VOCs" presented a poster in **Chemistry In-House Symposium on 21st August, 2019.**

CONFERENCES /SYMPOSIUM/WORK-SHOPS ATTENDED

(1) Workshop on the applications of LC-QTOF Techniques organized by the Department of Chemistry, ***IIT Madras and Agilent Technologies Pvt. Ltd***, Chennai, India on 24-25th June, 2019.

(2) Regional seminar on Health and Beauty Care of Adolescence, Human excellence, Phyto Chemistry and Herbal plants organized with Nagarjuna Herbal concentrates held in ***St. Aloysius College Elthuruth,*** Kerala, India on 25th September 2003.

(3) Regional seminar on Blue Revolution held at ***Little Flower College Guruvayoor, Kerala,*** India (*UGC sponsored*) on 24th February 2007.

(4) National seminar on Innovative Teaching Methods held in ***Christ College Irinjalakuda, Kerala,*** India from 9th July to 10th July, 2008.

(5) National seminar on Spice chemistry held in ***Little Flower College Guruvayoor, Kerala, India*** from 7th July to 8th July, 2010.

IMPORTANCE OF THE RESEARCH WORK

The key sources for the formation of secondary organic aerosols (SOAs) in the atmosphere are the emission of volatile organic compounds from biogenic and anthropogenic sources. Esters are one such hydrocarbon, which have been extensively used in industries as solvents. The emissions of CO_2 from ester compounds are negligible when compared to that of traditional petroleum fuel. The future scarcity of fuel increases the demand for environmental friendly renewable sources like esters. The wide usage of esters as fuel and fuel additives leads to their direct emission into the atmosphere.

The thermo chemistry, branching ratios, atmospheric implications such as radiative forcing, global warming potential, photo chemical ozone formation potential and cumulative atmospheric lifetime of ester compounds will be investigated both experimentally and computationally which will be highly useful for modelling studies.

Personal Profile:

Date of Birth	: 31/05/1986.
Marital Status	: Married
Nationality	: Indian
Permanent Address	: Cheramangalath (H), Chittanjoor (PO) Thrissur (DIST), Kerala, INDIA – 680523.
Languages known	: English, Malayalam.

REFERENCES

1. **Prof. B. Rajakumar**

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3. **Prof. T.A Sasidharan**

   Sree Narayana College,

   Nattika, Thrissur – 680566

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