

CH P 558: PHYSICAL CHEMISTRY PRACTICALS-IV

COURSE OUTCOME:

Includes large number of kinetic experiments from which students are made to choose five experiments which illustrate different principles of chemical kinetics. They are also expected to learn concepts of thermodynamics by carrying out 5 experiments from the respective section. The paper also includes two experiments from polymer chemistry topics and two experiments from spectroscopy. In addition to the above knowledge, the students are trained to develop skill of using computers to draw chemical structures, to plot the data and to carry out calculations

SPECIFIC COURSE OUTCOMES

- To Determine order of reaction order and activation parameters
- To study various types of reactions
- To determine the mechanism of reactions
- To study the catalytic constant, surface area of catalyst & temperature et.

A. Kinetics and Catalysis (Any Five Experiments are to be carried out)

Determination of reaction order and activation parameters, study of acidity/salt/solvent/catalytic effects on reaction rates of any FIVE of the reactions listed below.

1. Acid catalyzed hydrolysis of methyl acetate.
2. Saponification of ethyl acetate by conductivity method.
3. Decomposition of benzenediazonium chloride.
4. Reaction between potassium persulphate and potassium iodide (including the study of salt effect and catalysis by Ag^+ , Fe^{2+} and Cu^{2+} ions).
5. Decomposition of diacetone alcohol by NaOH & Hydrolysis of t-butylchloride.
6. (i) Reaction between iodine and acetone, and (ii) iodination of aniline.
7. Reaction between hydrogen peroxide and HI.
8. Decomposition of H_2O_2 (including the study of catalytic effect).
9. Reaction between Chromic acid and oxalic acid.
10. Reduction of aqueous solution of ferric chloride by stannous chloride.
11. Determination of the mechanism of the oxidation of an organic compound from kinetic data.
12. Determination of catalytic constant of an acid.
13. Determination of effect of surface area of catalyst and temperature on the kinetics of Metal-acid reaction.
14. Determination of dissociation of trichloroacetic acid-Kinetic method.
15. Determination of equilibrium constant for homogeneous equilibria and determining the concentration of a given solution.
16. Determine the molecular formula of copper-ammonia complex by the partition coefficient method.
17. Alkaline hydrolysis of ethyl acetate volumetrically.
18. Effect of reaction surface area of catalyst and temperature, concentration on the kinetics of metal-acid

B. Polymer Chemistry (Any Two experiments are to be carried out)

1. Determination of molecular weight and size parameters of polymers by viscometry.
2. Determination of sequences in polyvinylalcohol by viscometry.
3. Determination of molecular weight of a polymer by turbidimetry.
4. Preparation of Polymethylmethacrylate by suspension polymerization / polystyrene by free radical polymerization / Nylon by interfacial polymerization / Polyacrylamide by solution

polymerisation method / polyvinylalcohol from polyvinylacetate / Phenol formaldehyde/ urea formaldehyde resins / thin films of polymers.

C. Thermodynamics Experiments (Any Five experiments to be carried out)

1. Determination of activities of an electrolyte and non-electrolyte by cryoscopy.
2. Determination of partial molar volumes of (a) Salts-water and (b) alcohol-water (methanol & ethanol) systems by density method.
3. Study of complex formation between mercury and potassium halides by cryoscopy.
4. Determination of specific heat of liquids and solutions by calorimetry.
5. Determination of stepwise neutralisation of acids.
6. Determination of heat of solution of KNO_3 in water, integral heat of dilution of H_2SO_4 and heat of ionization of acetic acid and ammonium hydroxide calorimetrically.
7. Cryoscopic and ebullioscopic analysis of the given mixture of urea and glucose.
8. Determination of vant Hoff's factor for benzoic and acetic acid mixtures in benzene.
9. Viscosity of sound in liquid-ultrasonic interferometry

D. Spectroscopic Experiments (Any Two experiments to be carried out)

1. Kinetics of oxidation of alcohol by potassium dichromate – spectrophotometrically.
2. Simultaneous determination of Manganese and chromium in a solution of dichromate and permanganate mixture.
3. Determination of pKa of an indicator..
4. Spectroscopic investigation of partition coefficient of iodine between H_2O and CHCl_3 .
5. Study of the effect of ionic strength on the pH of the given acid with the help of indicators using buffer solution by colorimetric method.

E. Computer related Practicals: Solution of some selected chemical engineering problems to

develop skill for computer applications, programme writing and numerical analysis.

Use of commercial software packages such as Mathcad, Matlab, Aspan Plus, Design II, Use of Chem draw and Chem sketch for construction of molecules. Use of Window excel for drawing graphs estimation of slope intercept.

CH P 559: PROJECT WORK AND DISSERTATION

COURSE OUTCOME:

Enable the students:

- To design the project by collecting required background material by referring the literature
- To understand the functioning and safety features in the industry.
- To improve the experimental and soft skills.
- To learn various analytical and instrumental techniques and interpretation of analytical data.

Mangalore University

Mangalagangothri - 574 199



Department of Studies in Chemistry

Organises

International Webinar

on

Frontier Research in Chemical Sciences 2020

September 10 – 12, 2020



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Resource Persons

Alumnae of the Department



Dr. Sahana Mallya
SRI International, USA



Dr. Rashmi Nayak
NCL Pune, India



Dr. Shridevi S. Bhat
New York, USA



Dr. Anitha Alanthadka
IIT Roorkey, India



Dr. A. S. Amrutha
RIES, Hokkaido University, Japan



Dr. Sahana Roessler
Max-Planck Institute, Germany

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Prof. Boja Poojary

Prof. Jagadeesh Prasad D.

Dr. M. R. Maddani



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Department of Studies in Chemistry
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International Webinar
on

Frontier Research in Chemical Sciences 2020

September 10 – 12, 2020

Program Schedule

Thursday, 10-09-2020

- 10.00am-10.30am Inauguration
- 10.30am-11.30am **Lecture 1: Dr. Sahana Mallya, SRI International, USA**
Title SynJet™ – An automated chemistry platform for high throughput reaction screening and optimization
- 11.45am-12.45pm **Lecture 2: Dr. Rashmi Nayak, NCL Pune, India**
Title Luminescent molecular liquids for large area lighting applications

Friday, 11-09-2020

- 10.30am-11.30am **Lecture 3: Dr. Shridevi S. Bhat, New York, USA**
Title How nanotechnology can change the world?
- 11.45am-12.45pm **Lecture 4: Dr. Anitha Alanthadka, IIT Roorkee, India**
Title Sustainable catalytic methodologies towards the synthesis of N-heterocyclic compounds

Saturday, 12-09-2020

- 10.00am-11.00am **Lecture 5: Dr. A. S. Amrutha, RIES, Hokkaido University, Japan**
Title Targeted activation of motor protein – driven molecular transportation by visible light
- 11.15am-12.15pm **Lecture 6: Dr. Sahana Roessler, Max-Planck Institute, Germany**
Title Spin-orbit entangled states in 4d and 5d transition element compounds
- 12.30pm-01.00pm Valedictory





Mangalore University

Department of Studies in Chemistry

International Webinar on
Frontier Research in Chemical Sciences (FRCS 2020)



Mangalore University
Mangalagangothri - 574 199

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|  Dr. Anitha Alanthadka IIT Roorkee, India |  Dr. A. S. Amrutha RIES, Hokkaido University, Japan |  Dr. Sahana Roessler Max-Planck Institute, Germany |

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International Webinar
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Department of Studies in Chemistry, Mangalore University organised an international webinar on Frontier Research in Chemical Sciences (FRCS 2020) during September 10 - 12 2020.

This webinar was very special as all the invited resource persons are Alumnae of the Department of Chemistry, Mangalore University who are actively involved in research in India and abroad. Inauguration of the webinar was done on September 10 2020. Prof. P. S. Yadapadithaya presided over the Inauguration function. After the Inauguration, Dr. Sahana Mallya, SRI International, USA delivered the first lecture on 'SynJet™ - An automated chemistry platform for high throughput reaction screening and optimization. The 2nd lecture of the Day 1 was delivered by Dr. Rashmi Nayak, NCL Pune, India on 'Luminescent molecular liquids for large area lighting applications.

On the Day 2, Dr. Shridevi S. Bhat, New York, USA delivered the first lecture on 'How nanotechnology can change the world?' Subsequently, Dr. Anitha Alanthadka, IIT Roorkee, India presented the 2nd lecture on the topic 'Sustainable catalytic methodologies towards the synthesis of N-heterocyclic compounds' On the Day 3, Dr. A. S. Amrutha, RIES, Hokkaido University, Japan delivered the lecture on 'Targeted activation of motor protein - driven molecular transportation by visible light'. The last lecture of the webinar was presented by Dr.

Sahana Roessler, Max-Planck Institute, Germany on the topic ‘Spin-orbit entangled states in 4d and 5d transition element compounds’.

Faculties of various institutions, MSc students, Guest faculties and other invitees participated in the webinar. Overall around 250 participants benefited from this webinar. Almost all the participants appreciated the organising team for arranging such a wonderful webinar. Many of the participants actively interacted with all the resource persons. After all the lectures, valedictory function was conducted. Sri K. Raju Mogaveera, Registrar, Mangalore University presided over the valedictory function.

