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Technical Workshop Series - 2014

## One-Day Intensive Workshop on Size Exclusion Chromatography / Gel Permeation Chromatography

Wave 4

- Organized by SPIRIT, NCL & Venture Center -

Learn	Principles of Size Exclusion Chromatography (SEC)/ Gel Permeation Chromatography (GPC). Theory of separation and detection. Understanding the instrument including various sampling techniques, columns and detectors. Applications of SEC/GPC including molecular weight distribution/averages determination, branching frequency/ distribution determination and other structural aspects <b>for synthetic and natural polymers</b> . Best practices in SEC/GPC. Emphasis on high-temperature GPC with multi-detectors. Live demonstration of experiments and lab tour; Mini-workshop on data interpretation with real data; Quick update on latest techniques/developments; Workshop is intended to be basic.
Organized by	<ul style="list-style-type: none"><li>• SPIRIT: Sustainable Polymer Industry through Research, Innovation and Training - A Centre of Excellence in Polymers at National Chemical Laboratory, Pune sponsored by the Department of Chemicals and Petrochemicals</li><li>• Venture Center – a Technology Business Incubator</li></ul>
For whom	<ul style="list-style-type: none"><li>• Industry professionals wishing to expand their skill etc.</li><li>• Students and staff of polymer/ materials sciences/ engineering/ analytical/physical chemistry wishing to equip themselves for industry jobs</li><li>• Maximum 20 seats; First-come-first-serve.</li></ul>
Anchor Faculty	Mrs. Deepa Dhoble, Scientist, National Chemical Laboratory
VC Organization team	Sujaya Ingale, Edna Joseph , Pratima Jagtap
When	<b>Saturday, 19<sup>th</sup> July 2014, 9 am – 5:45 pm</b>
Where	Training room, Venture Center, 100 NCL Innovation Park, Dr. Homi Bhabha (Pashan) Road, Pune-411008
Contact	Lipika Biswas Venture Center, 100, NCL Innovation Park, Dr. Homi Bhabha Road, Pune – 411008; Phone: +91-20-2586-5877; Email: <a href="mailto:eventsdesk@venturecenter.co.in">eventsdesk@venturecenter.co.in</a>
Cost	<ul style="list-style-type: none"><li>• Micro and small enterprises/ individuals: Rs 2,000/-</li><li>• Medium and large companies/ others: Rs 4,000/-</li><li>• Students with valid ID card: Rs 900/-</li></ul>



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## Introduction

Size Exclusion Chromatography (SEC)/ Gel Permeation Chromatography (GPC) is a commonly used technique for the determination/ characterization of the molecular weight distribution, molecular weight averages and certain aspects of molecular structure/ micro-structure of synthetic and natural polymers (including **plastics, fibers, adhesives, coating materials, biopolymers** etc) by researchers, industrial research labs and sometimes, QC/QA labs. Today SEC/GPC is key instrument in any lab working with polymers. Learning about SEC/GPC is essential for any person working with polymeric materials. This workshop shall emphasize **SEC/GPC with a triple/ multi- detector system** that allows more versatile measurement of molecular properties of polymers.

This workshop aims to give an introduction to the principles and practice of SEC/GPC for industry professionals and students. The workshop shall be taught by an NCL scientist with decades of experience working with SEC/GPC. The workshop includes lab demonstrations and data interpretation exercises. The workshop shall also discuss some recent trends and new developments in research and industry relating to SEC/GPC.

## Course Outline

- Principles of Size Exclusion Chromatography (SEC)/ Gel Permeation Chromatography (GPC).
- Theory of separation and detection.
- Understanding the instrument including various sampling techniques, columns and detectors.
- Applications of SEC/GPC including molecular weight distribution/averages determination, branching frequency/ distribution determination and other structural aspects **for synthetic and natural polymers**.
- Best practices in SEC/GPC. Emphasis on high-temperature GPC with multi-detectors (triple-detector).
- Live demonstration of experiments and lab tour
- Mini-workshop on data interpretation with real data
- Quick update on latest techniques/developments

Time	Session title		Lead	Venue
9:00 to 9:30	Registration			Foyer, Learning Center, VC
9:30 to 9:45	Introduction to the course and faculty		Dr. V Premnath	Training room, VC
9:45 to 10:45	Introduction and basic principles; Molecular weight distribution and molecular structure nomenclature; Quick overview of GPC; Basic principles of separation; Typical data recorded; Elution curves.		Mrs. Deepa Dhoble	Training room, VC
10:45 to 11:15	Tea			Foyer, Learning Center, VC
11:15 to 12:00	Instrument details; Columns; Solvents; Injectors; Pumps; Detectors. Principles of detection & appropriate use of calibration.		Mrs. Deepa Dhoble	Training room, VC
12:00 to 12:05	Break			
12:05 to 13:05	Applications of SEC/GPC including molecular weight distribution/averages determination, branching frequency/ distribution determination and other structural aspects <b>for synthetic and natural polymers</b> . Interactive session – Real case studies and application notes		Mrs. Deepa Dhoble	Training room, VC
13:05 to 14:00	Lunch			
14:00 to 14:30	Best practices in SEC/GPC.		Mrs. Deepa Dhoble	Training room, VC
14:30 to 16:30	Group 1	Group 2	Mrs. Poorvi Purohit Mr. Hemant Phadnis (Malvern Instruments) Mrs. Deepa Dhoble	PAML, NCL
	Instrument 1	Instrument 2		
	<ul style="list-style-type: none"> <li>Instrument parts</li> <li>Sample preparation</li> <li>Injection</li> <li>Data interpretation exercise</li> <li>Calculations</li> </ul>	<ul style="list-style-type: none"> <li>Instrument parts</li> <li>Sample preparation</li> <li>Injection</li> <li>Data interpretation exercise</li> <li>Calculations</li> </ul>		
	Tour of 3D system			
16:30 to 17:00	Tea			Foyer, Learning Center, VC
17:00 to 17:45	Closure – Feedback, Certificate distribution		Dr. V Premnath	Board room, VC

Anchor Faculty	
	<p><b>Mrs Deepa Dhoble</b> is a Scientist in Complex Fluids &amp; Polymer Engineering Group, Polymers &amp; Advanced Materials Laboratory, National Chemical Laboratory, Pune – 411008, India.</p> <p>She has more than 25 years of research experience in Polymer Chemistry and Technology both in applied and basic R&amp;D activities. The activities include characterization of polymers by various analytical instrumental methods, establishing structure-property relationships, studying behavior of polymer solutions, physical properties of polymers, polymer-surfactant interactions, synthesis of water soluble polymers and hydro gels for various applications. Worked on several industrial projects including synthesis &amp; characterization of various polymers (ONGC, GAIL, Reliance Industries Ltd, Lupin Research Park, RPG Life Science, Apcotex Lattices Ltd. etc.).</p>
Other faculty	<p>Dr V. Premnath is Scientist, Complex Fluids and Polymer Engineering Group at NCL, Pune, Head, NCL Innovations and Director, Venture Center. He specializes in Polymer Science and Engineering.</p> <p>Mrs. Poorvi Purohit is working in Complex Fluids &amp; Polymer Engineering Group at NCL, Pune. She has more than 13 years of research experience in polymer characterization using advanced analytical instruments viz: GPC, DSC, TGA, DMA, UV-Vis and FTIR.</p> <p>Mrs Sujaya Ingale and Ms Edna Joseph shall organize and assist in lab demos.</p>



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#### Course includes

- Course notes (hard copy) including slides, case studies, application notes
- Lab demo and tour to see 3 instruments
- Access to restricted website with online compilation of resources for SEC/GPC
- One-on-one feedback on data interpretation exercise
- Certificate of Participation issued by Venture Center
- Course includes tea and lunch at Venture Center cafeteria

#### About the organizers

##### **About Venture Center**

Entrepreneurship Development Center (Venture Center) – a CSIR initiative – is a Section 25 company hosted by the National Chemical Laboratory, Pune. Venture Center strives to nucleate and nurture technology and knowledge-based enterprises by leveraging the scientific and engineering competencies of the institutions in the Pune region in India. The Venture Center is a technology business incubator supported by the Department of Science & Technology's National Science & Technology Entrepreneurship Development Board (DST-NSTEDB). Venture Center's focuses on technology enterprises offering products and services exploiting scientific expertise in the areas of materials, chemicals and biological sciences & engineering. For more information, visit <http://www.venturecenter.co.in>

##### **About SPIRIT at National Chemical Laboratory, Pune**

SPIRIT stands for Sustainable Polymer Industry through Research, Innovation and Training. SPIRIT is a Centre of Excellence in Polymers sponsored by the Department of Chemicals and Petrochemicals, Government of India, at the CSIR-National Chemical Laboratory, Pune. More information: <http://www.pamlab.org/spirit/>