



Industrial Consultancy & Sponsored Research (IC&SR)

METHOD FOR PRODUCING POLYSTYRENE MICROPARTICLES OR MICROFIBERS FROM WASTE POLYSTYRENE USING SPINNING DISK

IITM Technology Available for Licensing

PROBLEM STATEMENT

- Expanded Polystyrene (EPS) is a cost-effective, lightweight, corrosion-resistant, and processable polymer used in various applications.
- However, its waste production poses **environmental issues** due to its non-biodegradability and large volume to weight ratio. WPS is primarily disposed of through landfills or incineration, causing soil and water pollution.
- Mechanical recycling methods are expensive and aim to eliminate polystyrene. **Recycling WPS into valuable products like nano or microparticles and microfibers** is necessary for biomedical applications, imaging, and oil adsorption.
- Conventional methods have limitations, **necessitating an alternative method for microfiber production.**

TECHNOLOGY CATEGORY MARKET

Technology: Polystyrene Microparticles and Microfibers

Category: Chemistry & Chemical Analysis

Industry: Chemical Industry/Textile Manufacturing Industry

Application: Micro-particle synthesis /Polymer particle production, Biomedical application.

Market: The global market size of Polystyrene was valued at **USD 81.1 Billion in 2022**, and is estimated to reach **USD 160.1 Billion by 2032**, growing at a **CAGR of 7.1% from 2023 to 2032.**

INTELLECTUAL PROPERTY

IITM IDF Ref.2560

Patent No: IN 529955

TRL (Technology Readiness Level)

TRL-4, Experimentally validated in Lab;

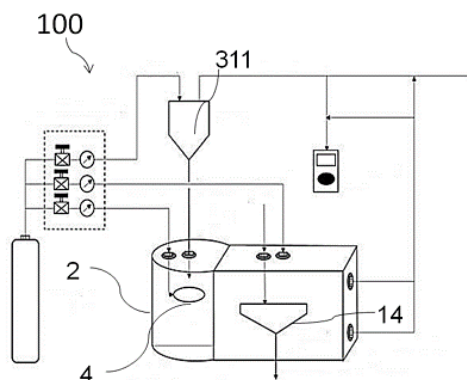
Research Lab

Prof. Raghunathan Rengaswamy
Prof. Basavaraja Madivala Gurappa,
Dept. of Chemical Engineering, IIT Madras.

TECHNOLOGY

- A method for reclaiming polystyrene microparticles or microfibers from waste expanded **polystyrene using a spinning disc apparatus.**
- The process involves **dissolving** a predetermined amount of **polystyrene waste** in filtering to **remove impurities**, and dilution to create a diluted feed liquid.
- Then introduced into the **spinning disc apparatus** to produce **micro-droplets** with a narrow size distribution.
- Concentrated feed fluid is used to generate **fluid ligaments, resulting in microfibers** with a narrow range of diameters and nanoporous surfaces.

Apparatus



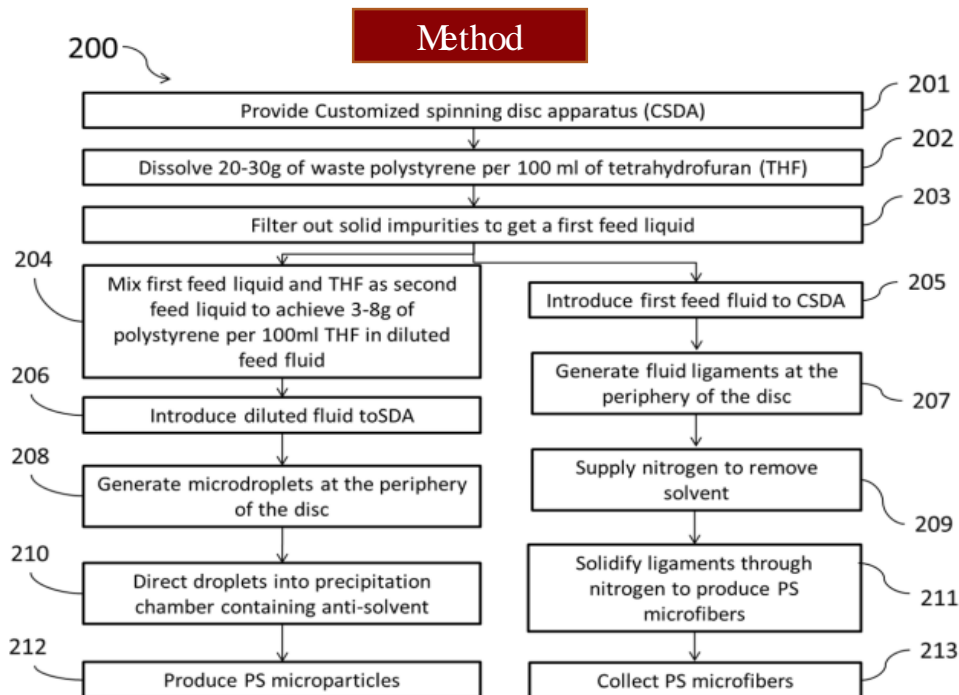
- 100- Spinning disc apparatus
- 311- Feed Vessel
- 2- Enclosure
- 4- Disc
- 14- Precipitation chamber

CONTACT US

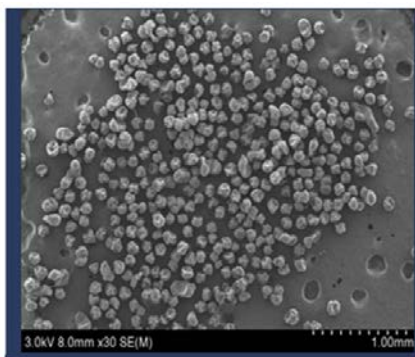
Dr. Dara Ajay, Head TTO
Technology Transfer Office,
IPM Cell- IC&SR, IIT Madras

IITM TTO Website:
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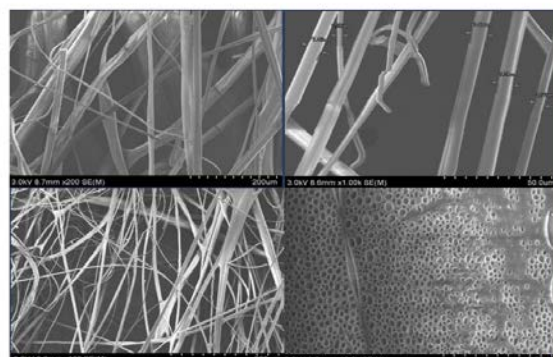
Email: smipm-icsr@icsrpis.iitm.ac.in
sm-marketing@imail.iitm.ac.in
Phone: +91-44-2257 9756/ 9719



SEM Images



Polystyrene micro particles



Polystyrene microfibres

Key Features / Value Proposition

- Polystyrene micro**fibres** average **diameter 10 ± 4 micrometer**.
- Polystyrene micro-**particles** is obtained in the range **90-125 microns**.
- Biomedical applications, imaging, **preparation of engineered colloid particles, oil adsorption**.
- Used for lateral flow tests, **latex agglutination tests, flow cytometry**, fluorescence microscopy, and as calibration particles.
- One of the best oil sorbents to **absorb oil from the ocean in case of oil spills**.
- Polystyrene fibers are also used as **fiber membranes and as additives in the paint industry**.

CONTACT US

Dr. Dara Ajay, Head TTO
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IITM TTO Website:
<https://ipm.icsr.in/ipm/>

Email: smipm-icsr@icsrpis.iitm.ac.in

sm-marketing@imail.iitm.ac.in

Phone: +91-44-2257 9756/ 9719