

PROCEEDINGS

National Workshop  
on  
Instrumentation Techniques  
for  
Research in Chemical Sciences  
(WITRCS - 2017)

22-23 December, 2017



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Kanoria Mahila PG Mahavidyalaya  
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*National Workshop on Instrumentation Techniques for Research in Chemical Sciences*

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**Instrumentation Techniques**  
for  
**Research in Chemical Sciences**  
(WITRCS- 2017)

22-23 December, 2017

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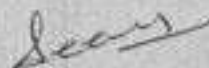
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## An Impact of Nanotechnology on Water Purification

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### Abstract

Nanotechnology exploits nanoscopic materials for nanofiltration of water. Nanofiltration is used for better water purification. IN Nanotechnology, nanomembrane are used for the softening the water and removal of contaminants. The important application of nanofiltration (NF) is lower energy consumption and higher flux rates. Nanotechnology will create incredible opportunities for improvement of water purification.

**Keywords:** Nanomembrane, Nanofiltration, Contaminants, Consumption, Flux Rate.

### INTRODUCTION:

Nanotechnology plays a vital role in water purification. Nanotechnology is defined as a branch

of engineering that deals with creating objects smaller than 100 nm in size. It is vision of building objects atom by atom, molecule by molecule<sup>1,2</sup>.

To address the undeniable need of pure water, various water treatment technologies have been proposed such as centrifugation, separation, reverse osmosis (RO), Nanofiltration (NF), Adsorption, Electrolysis, Ultrafiltration<sup>3</sup>. Nanotechnology is used for removal of sediments, chemical effluents, charged particles, bacteria. Membrane filtration allows the passage of water solvent but rejects solutes, gases, fluids and various particles present in the polluted water.

#### Nanomembranes

Nanofiltration technology is widely used for in waste water treatment due to its low energy consumption, in which the properties on Nanofiltration membranes (NFMs) are of vital importance<sup>4,5</sup>. Graphene Nanomembrane is used for nanofiltration as it is very thin in nature<sup>6</sup>. Ultrathin (22-53 nm thick) graphene membranes with 2D Nanochannels is successfully applied as NFMs for water purification. Metal and metal oxides are a diverse class of nanomaterials which are applied for water treatment. Zerovalent Iron, TiO<sub>2</sub><sup>7</sup>. The effectiveness of various metal and metal oxides membrane for the removal of phosphate from water. A thin low cost Nanofiltration is formed by M-

Phenylenediamine (MPD) and Trimesoyl chloride (TMC) and coated on both sides of a Polyacrylonitrile (PAN) membrane.

#### Merits of Nanotechnology:

The main merit of using Nano filters is that less pressure is required to pass water across the filter and can be more easily cleaned by back flushing. More surface area and small volume of Nanoparticles make them effective for water purification. Nanoparticles are more stable and durable. The nanoparticle based technology is very important in increasing water quality standards and removal of emerging pollutants.

#### CONCLUSION:

The challenge of the growing Nanofiltration technology is to ensure that Nanotechnologies evolve as tools that enable sustainability rather than environmental liabilities. Nano based technology may become very important specially for the removal of emerging pollutants and chemical, biological contaminants<sup>8,9</sup>.

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