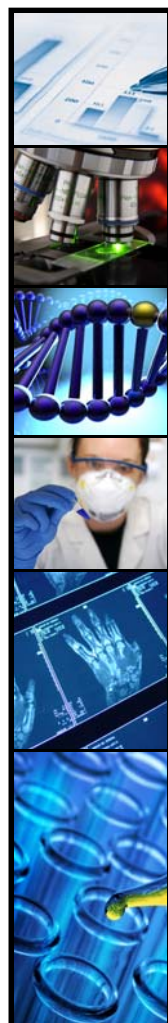


DESIGNER NANOPORE CHROMATOGRAPHY

Microchip-based chromatography systems using nanopore/nanotube arrays



Bridging the gap between research, commercialisation, and investors.



The Australian Research Network is a consulting company focused on emerging Australian technologies.

INTRODUCTION

Researchers at the University of South Australia have developed a new concept for chromatography separation that has the potential to make significant impact in design and effectiveness of chromatography separation technology.

Chromatography is a technique for separating of mixtures into their individual components used as standard analytical technique in most chemical and life science industries including pharmaceutical industry, proteomics, food safety, environmental analysis, homeland security, hydrocarbon processing etc.

In liquid chromatography, a moving liquid (the mobile phase) carries the sample across a stationary phase using a specially designed columns with solid support where the sample components separate based on their differing affinity with the stationary phase. There are many classes of chromatography systems but all use large instrument, large volume of samples and they are very expensive.

Dr. Dusan Losic is a Senior Research Fellow at the Ian Wark Research Institute. His fabrication process using advanced electrochemical nanostructuring allows controlled manipulation of internal pore structures and fabrication of nanoporous materials with complex pore geometries and pore organisation.

This platform technology has promising applications that can be integrated within conventional chromatography systems or can be used to develop a new line of products.

TECHNOLOGY

The Designer Nanopore chromatography application integrates pores with nano scale dimensions as separation columns within a lab on a chip technology. These special arrays of nanopores (less than 10nm) and nanotubes offers molecular separation using IP protected fabrication process which significantly reduced volume of sample and ability to design a miniature chromatographic system on microchip. This new chromatography concept has potential in the following areas:

- Design of new microchip chromatography device based on nanofabricated nanopore and nanotube arrays which allows significant miniaturization of chromatography instrument
- The use of developed nanopore/nanotube separation column into conventional chromatography systems
- Incorporation of the microchip nanopore device in the design and development of a series of new microchip-based chromatography systems for diverse applications in proteomics, pharmaceuticals, food analysis, environmental analysis and defence systems.

ADVANTAGES

Designer Nanopore Chromatography is expected to produce some significant competitive advantages:

- Greater efficiencies in chromatography separation
- Faster separation time – an estimated 20x increase in processing time
- Considerably less sample quantity required
- Miniaturization of instrumentation and space required compared to conventional chromatography systems



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ADVANTAGES (Cont'd)

- Greater versatility in design
- Cost effective manufacturing and system development
- Immediate replacement value within existing chromatography systems - replacing existing large columns (cm in length) with miniature columns (mm in length)
- Provides simpler manual operation
- Can be integrated with silicon, metal oxides and composite materials



CURRENT STATUS AND PROOF OF CONCEPT WORK

Several nanofabrication processes were developed for nanostructuring of nanopores/nanotubes. Testing of the separation properties of these pores using a series of model molecules is underway to evaluate the properties of these devices in comparison with existing chromatography systems. In the project plan, new nanochannel columns arrays for chromatographic separation will be fabricated using Designer Nanopore technology and will have controlled diameters, lengths, shapes and surface chemistry.

The project plan includes:

1. The improving of fabrication protocols and reproducibility of the columns;
2. Dimension and chemical composition characterisation required for use within the chromatographic system for specific applications;
3. Evaluation of column functionality and performances
4. Finally, column integration within a chromatographic system

INTELLECTUAL PROPERTY

The technology is protected by a PCT application that covers the specific embodiments of the underlying platform.

OPPORTUNITY

The research at the Ian Wark Research Institute is world class. Designer Nanopore Chromatography requires co-development and the University of South Australia facilities and its researchers, lead by Dr. Losic, are well established to complete further proof of concept studies with partner funding.

ABOUT TM VENTURES AND THE AUSTRALIAN RESEARCH NETWORK

From the Black Box Flight Recorder to Google Maps, Australia's innovation system is transforming the world we live in. CSL's anti-cancer vaccine (Gardasil), Biota's flu treatment (Relenza) and Cochlear's Bionic Ear are but a handful of medical technologies that were born of Aussie talent.

The Australian Research Network is a boutique consulting and business development company focused on emerging Australian innovation. The Network is committed to maximizing the value of technologies for both our domestic and international clients and if your company is considering Australian investment opportunities, contact us.

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