Non-Monotonic, Cavity-Based Nanopore for Polymer Filtration

INVENTORS:

Dr. Hendrick W. de Haan

OVERVIEW: A novel nanopore technology was developed with a large internal cavity that can be used for applications such as the selective extraction of polymers by length and filtering of solutions of polymers.

PATENT PROTECTION: US provisional application: 62/245,434

TARGET MARKETS: Nanofluidic, next gen. sequencing, biomedical, filtration, life sciences

BACKGROUND

It is anticipated that the next generation sequencing (NGS) market will witness a whole new generation of sequencing platforms based on nanopore sequencing technology and fully integrated instruments in a few years that could help perform all the NGS workflow steps. As such, this new research and development has helped increase accuracy and speed while reducing the overall costs of sequencing. NGS is the fastest-growing and most lucrative segment in the genomics space with an estimated growth of 23.1%. The global NGS market will be worth $2.5 billion in 2014 and is poised to reach $8.7 billion by 2020. Next generation sequencing is set to revolutionize applied markets such as diagnostics, drug discovery, biomarker discovery, personalized medicine, and agriculture and animals research. (marketsandmarkets.com)

TECHNOLOGY OVERVIEW

The research led by Dr. Hendrick W. de Haan has developed a novel nanopore technology that enables selective extraction and filtration of solutions of polymers. It is found that the total translocation time is a non-monotonic function of the polymer length and reaches a minimum for a polymer of intermediate length with both shorter and longer polymers taking a longer time to translocate. Beyond the non-monotonicity, detailed analysis of the translocation process uncovers a rich set of dynamics in which factors such as; going to a high force regime and the emergence of a tail on the cis side for long polymers dramatically change the behaviour and function of the system. These results suggest that nanopores with a large internal cavity can be used for applications such as the selective extraction of polymers by length and filtering of solutions of polymers thus extending the uses of nanopores within the emerging nanofluidic technologies market. This system is an early stage technology with large applications within the biomedical field.

BUSINESS OPPORTUNITY

UOIT looks to work with companies in a way that helps develop a relationship that is tailored around their interests. Thus, we are happy to explore collaborations, licenses, options, assignments, etc. It is the belief that only through enabling the company to utilize their business model will the UOIT technology be able to make impact within the marketplace.

ABOUT UOIT

UOIT conducts high-quality, rigorous research designed to meet the research and development needs of business and industry and benefit society. Whether the focus is on developing hydrogen-from-nuclear or fuel-cell technologies, improving network security or understanding youth crime, we are committed to interdisciplinary research and development that addresses social, environmental, health and economic challenges.