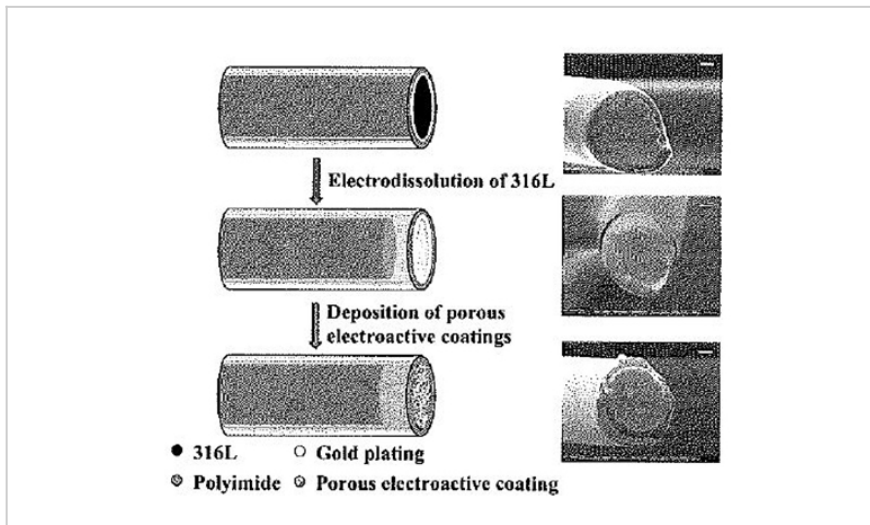


Micro-Reaction Chamber Microelectrodes for Neural and Biointerfaces

ID# 2011-3822



Microwire uRC fabrication

Technology Summary

The subject invention consists of neural micro-wire electrodes with micro-reaction chambers (μ RC) interfaces which improve sensitivity without impairing selectivity. The μ RC electrodes show 3x charge storage capacity than a bare solid-planar (SPI) electrode. Because of its ability to pass significantly higher amount of charge, the invention's electrode has smaller geometric surface area (GSA) than SPI electrodes, reducing tissue trauma and increasing sensitivity. The combination of high frequency (~ 1 kHz) action potential recordings and lower frequency content (< 300 Hz) local field potential records increases the signal-noise ratio of both action potential and LFP recordings.

Application & Market Utility

The μ RC electrodes have utility for both neural recording and micro stimulation under acute and chronic implantation conditions. The invention offers greatly enhanced electrode performance without increasing the electrode size. This minimizes tissue damage and improves the long-term viability of the electrode, which enhance the electrode's performance for stimulation. Alternatively, by lowering noise and signal degradation, the invention has utility in neural recordings.

Next Steps

An assortment of prototypes have been manufactured and tested in vitro for both stimulation and recording, and in vivo for recording. The Penn State inventors are currently testing the prototypes for recording in chronic implants.

TECHNOLOGY READINESS LEVEL

4-7

Seeking

Investment | Licensing | Research

Keywords

- Neural electrodes
- neural interface
- biocompatible coating
- neural prosthesis
- US Patent No. 9,592,378

Researchers

Bruce Gluckman

Associate Director, Penn State Center for Neural Engineering

[Online Bio](#)

Balaji Shanmugasundaram

Graduate Student Researcher

Originating College

College of Engineering

Office of Technology Management Contact

Smith, Matthew
mds126@psu.edu
814-863-1122



Invent Penn State is a Commonwealth-wide initiative to spur economic development, job creation, and student career success. Invent Penn State blends entrepreneurship-focused academic programs, business startup training and incubation, funding for commercialization, and university-community collaborations to facilitate the challenging process of turning research discoveries into valuable products and services that can benefit Pennsylvanians and humankind. Learn more at invent.psu.edu.

Penn State is an equal opportunity, affirmative action employer, and is committed to providing employment opportunities to all qualified applicants without regard to race, color, religion, age, sex, sexual orientation, gender identity, national origin, disability or protected veteran status.