Micro-Reaction Chamber Microelectrodes for Neural and Biointerfaces

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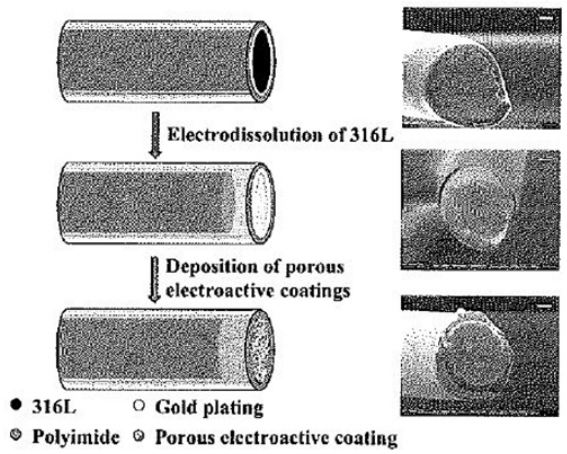

Microwire uRC fabrication

Technology Summary

The subject invention consists of neural micro-wire electrodes with micro-reaction chambers (µRC) interfaces which improve sensitivity without impairing selectivity. The µRC 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 µRC 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

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