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# Conducting Polymers for Neuronal Microelectrode Array Recording and Stimulation

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## Abstract

Microelectrode arrays (MEAs) are of great interest for *in-vitro* and *in-vivo* electrophysiology as they can record and stimulate neuronal populations, paving the path for novel treatment strategies in auditory, visual and movement impairments. MEAs intended for such applications are restricted by small electrode geometries, resulting in high impedance and low charge injection limits. Efforts to improve these parameters have involved the use of rough electroactive surface coatings on conventional planar microelectrodes to increase the electrochemical surface area and subsequently improve recording and stimulation from MEAs. Conducting polymers have shown promise as microelectrode coatings for MEA devices. Here we review how microelectrodes on MEA devices transduce neuronal signals to electrical signals and then detail the influence of conducting polymer coatings on microelectrode recording/stimulation performance and stability.

**Keywords:** Impedance, charge storage capacity, biomolecular dopants, interface, microelectrode, neuronal

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