

## 論文の内容の要旨

論文題目 Conformal multi-electrode arrays using organic electrochemical transistors  
(有機電気化学トランジスタを用いたコンフォーマル多点電極アレイ)

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Organic electronic devices offer promising routes for in vivo electrophysiological recordings of neuronal circuits due to their mechanical flexibility and biocompatibility. Especially, Organic electrochemical transistors (OECTs) have shown a superior signal-to-noise ratio (SNR) due to local signal amplification and are able to record neural activities on the cortical surface of rat brain. Accessing the complex signal landscape over the whole brain surface area of larger mammals will require active multiplexing in order to achieve the necessary spatio-temporal resolutions.

In this work, we developed multielectrode-array (MEA), which can be actively multiplexed by OECTs or organic transistors, on ultra-flexible substrate less than 1  $\mu\text{m}$ -thickness. The ultra-thinness give high conformability to device, and it makes easy to laminate on complex surface such as wrinkled surface of brain or dynamically moving heart. The active components in ultra-conformable MEA were mechanically stable when there was harsh deformation such as crumpling, or compressing.

With the high conformability and mechanical stability of conformable MEA, we demonstrated to record various bio-electric signals such as electromyography (EMG), electrocorticogram (ECoG), and electrocardiogram (ECG) with spatio-temporal information. Also, the each conformable MEAs has designed to have transparency, stretch-ability, blood compatibility to deal with different environment of target application.

