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DLC Film Deposited on Micro-Electrode with NBECVD for Bio-LSIs

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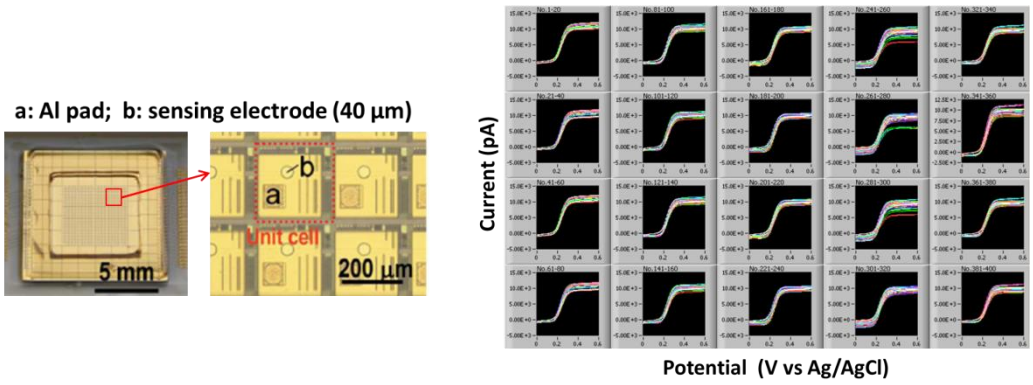
Bio-LSI has been developed as advanced bio-sensing device for electrochemical bio-imaging and multi-point bio-sensing [1]. Based on this work, we want to find suitable electrode material, which can provide high sensitive bio-imaging platform for wide applications. As known, diamond-like carbon (DLC) film has good chemical stability and mechanical properties. There are some reports on the electrochemical behavior of DLC for some redox species [2]. DLC has much wider potential window than traditional metal electrode so it is a promising candidate electrode material for Bio-LSI sensor. To apply DLC film in this use, the challenge is to carry out the deposition in low temperature because the integrated transistors in Bio-LSI can't be processed with high temperature. In this study, we performed the DLC film deposition in low temperature with neutral beam enhanced chemical vapor deposition (NBECVD).

The NBECVD device is detailed descried in Ref. 3, in which the conductive amorphous hydrocarbon (aCH) is successfully deposited in low temperature. In the following work, we used nitrogen doping to make the DLC film express a significantly improved voltammetry property. With this improvement in electrochemical property, this DLC film was applied in the Bio-LSI fabrication. Cyclic voltammograms of the Bio-LSI with DLC film electrode is shown in Fig. 1 (b). More experimental details and results will be presented in the conference.



(a) (b)

Fig.1 (a) Structure of Bio-LSI chip; (b) Cyclic voltammograms of N-doped DLC film deposited Bio-LSI in 2.0 mM ferrocenemethanol (FMA) with 0.1 M KCl solution

References:

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