課題番号　　:F-17-KT-0166
利用形態　　:機器利用
利用課題名（日本語）　　:DNA オリガミのサイズ分離用 ANA(Anisotropic Nanofluidic Array)デバイス　1
Program Title(English)　　:ANA(Anisotropic Nanofluidic Array) device for DNA size separation　1
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キーワード／Keyword　　:リソグラフィ・露光・描画装置、DNA オリガミ、高速マスクレス露光

1. 概要（Summary）

In this work, a dielectrophoretic (DEP) trapping-based microfluidic purification device for DNA origami complexes was developed. In order to reduce the voltage for common electrodes from several hundred volts to a few tens volt, the inner electrodes were designed and successfully fabricated as below.

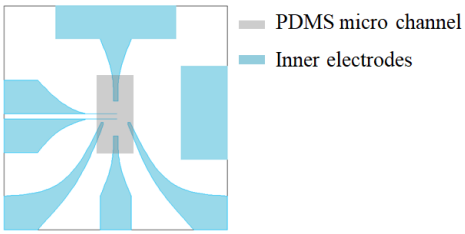

Fig. 1 The schematic diagram of the inner electrodes

2. 実験（Experimental）

【利用した主な装置】

A04 高速マスクレス露光装置

A08 レジスト塗布装置

【実験方法】

The ITO inner electrodes were fabricated shown as follow: A layer of THMR-iP1800 was spin-coated (A08) on ITO glass substrate and baked. The photoresist was exposed to UV light (A04). After the post-exposure bake, the substrate was developed. Again, the developer was removed carefully with acetone and isopropanol. The substrate was then submerged in HCl solution to etch off the ITO in direct contact with the solvent.

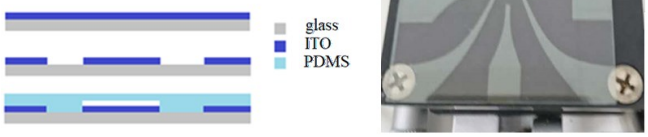

Fig. 2 The fabrication process and result of the inner electrodes.

3. 結果と考察（Results and Discussion）

The function of the inner electrodes was tested by flow experiment using λ DNA. They can lead the disorders in the electric field in the channel sometimes. Meanwhile, the inner electrodes can induced strong electric fields to trap the DNA molecules forming the deflection along the channel structure (Fig. 3a). This phenomenon soon disappeared because of the decrease of the electric field near the bridge caused by the corrosion of the electrodes (Figs. 3 b, c). The gold inner electrodes were fabricated with similar processes, while corrosion caused by electrochemical reaction still happen in the experiments.

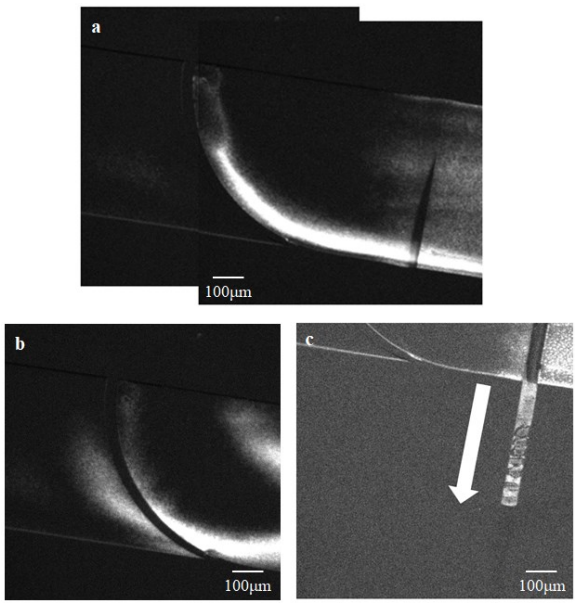

Fig. 3 The experiment result using ITO inner electrodes.

3. その他・特記事項（Others）

特になし。

4. 論文・学会発表（Publication/Presentation）

なし。

5. 関連特許（Patent）

なし。