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 利用課題名(日本語) :  
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### 1. 概要(Summary)

Nanostructure-based surface plasmon resonance (SPR) biosensors have attracted great attention since the phenomenon of extraordinary light transmission in metallic nanohole arrays was discovered. However, mass production of uniform metallic nanostructures with a low-cost, rapid and high-throughput fabrication process is a key issue for various multiplex sensing applications. Here, we utilized injection compression molding to massively fabricate nanoslit-based Al nanoarrays.

### 2. 実験(Experimental)

#### 【利用した主な装置】

Electron Beam Lithography (Elionix ELS-130HM), Helicon Sputtering (ULVAC MPS-4000C1/HC1), SEM (JEOL JSM-6700FT)

#### 【実験方法】

Figure 1a shows the fabrication flowchart of the Ni-Co mold for compression-injection molding. Periodic nano-groove arrays were fabricated using an electron beam lithography. The resist patterns were then coated with gold using a sputter and then electroformed with Ni and Co to produce a metal mold. Al nanostructures were fabricated using compression-injection molding method. To

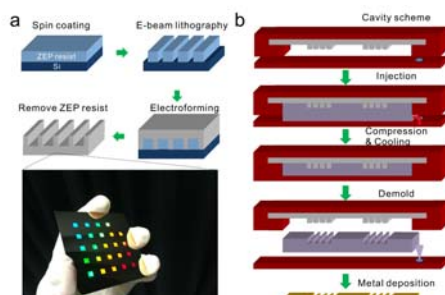


Figure 1. Fabrication flowchart of the Ni-Co mold.

protect the Al and enhance the surface sensitivity, a 30-nm-thick silica film was deposited on the Al nanoslits using a RF sputter.

### 3. 結果と考察(Results and Discussion)

The uniformity and reproducibility of nanoslit-based Al structure arrays are key issues for multiplex sensing applications. Figure 2a shows the transmission image of Al nanoslits arrays with a 470 nm period, 60 nm slit width and capped with a 30-nm-thick silicon layer. There were 24 arrays on the chip. Figure 2b show the measured transmission spectra of each chip in air for normally-incident TM-polarized light. This high uniformity and reproducibility of nanoslit-based Al structure arrays are favorable for biosensing applications.

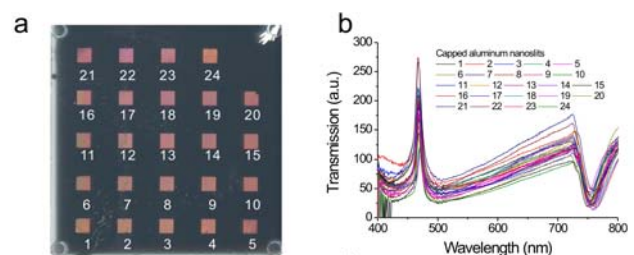


Figure 2. (a) Optical transmission image of alumina-capped Al nanoslits. (b) The measured transmission spectra of 470-nm-period capped Al nanoslits at different positions in air.

### 4. その他・特記事項(Others)

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### 5. 論文・学会発表(Publication/Presentation)

なし

### 6. 関連特許(Patent)

なし