

課題番号 : F-21-UT-0146  
利用形態 : 機器利用  
利用課題名(日本語) :  
Program Title (English) : The formation of patterned Ni thin film  
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キーワード/Keyword : 成膜・膜堆積、スパッタ、燃料電池、Ni、エネルギー関連技術

### 1. 概要(Summary)

Ni-YSZ (Yttria-stabilized zirconia) fuel electrode is widely used in solid oxide fuel cells. It is of vital importance to improve its stability and performance during long term operation. In the present study, to investigate the morphological changes and degradation mechanisms of Ni-YSZ electrode, patterned Ni thin film electrode is sputtered on YSZ pellet using the equipment of the University of Tokyo, Ultrafine lithography nano-measurement center.

### 2. 実験(Experimental)

#### 【利用した主な装置】

高密度汎用スパッタリング装置

#### 【実験方法】

Patterned thin film Ni fuel electrode with well-defined triple phase boundary (TPB) was sputtered on the surface of YSZ pellet by using a sputtering machine (CES-4ES, Shibaura, Japan) with a 99.9% purity Ni target. The sputtering was repeated twice with a specially designed steel mask (Geomatec Co. Ltd., Japan) rotated 90° after the first sputtering to obtain 1 μm-thick Ni film. The sputtering was performed at room temperature under the conditions of Ar atmosphere, pressure of 0.5 Pa and RF power of 300 W.

### 3. 結果と考察(Results and Discussion)

Figure 1 shows the Ni mesh (white) on YSZ pellet (dark grey) after sputtering.

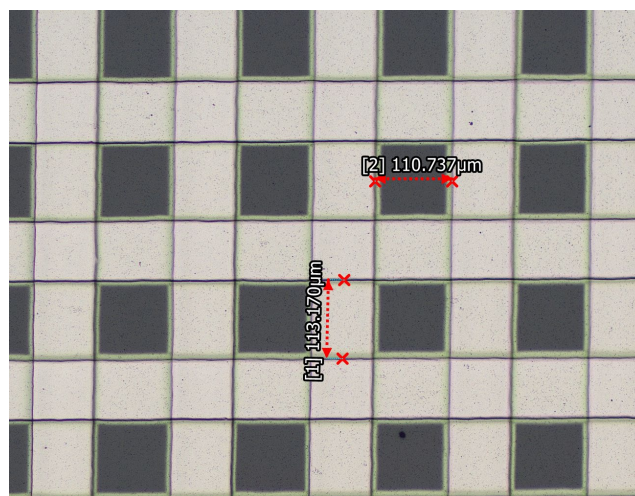


Fig. 1 Top-view microscopic image of Ni mesh (white) on YSZ substrate (dark grey).

### 4. その他・特記事項(Others)

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

Ouyang, Z. *et al.*, ECS Trans., 2021, 103(1): 1219

### 6. 関連特許(Patent)

なし。