

課題番号 : F-21-HK-0051  
利用形態 : 機器利用  
利用課題名(日本語) : 異なるプラズモン場によりキラル結晶化の制御  
Program Title (English) : Controlling crystallization with different plasmonic fields  
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## 1. 概要(Summary)

In this study, we compared the dependence on two plasmon mode according to the size of gold trimer nanostructures. A CW laser with a wavelength of 1064 nm was irradiated on a gold trimer nanostructure immersed in a saturated solution of sodium chlorate ( $\text{NaClO}_3$ ) to form crystals. The crystallization behaviors are investigated with two edge length trimer gold nanostructures.

## 2. 実験(Experimental)

### 【利用した主な装置】

超高精度電子ビーム描画装置 125kV、ヘリコンスパッタリング装置、多元スパッタ装置、超高分解能走査型電子顕微鏡

### 【実験方法】

Trimer gold nanostructures composed of 3 triangles forming a central nanogap (10-20 nm) were designed and fabricated on a thin cover glass. The edge length of the triangles is tuned according to excited plasmon at laser light 1064 nm based on the computer simulation. Trimer gold nanostructures with two different edge lengths were fabricated: 170 nm and 230 nm edge-length trimers (Figure 1). Then crystallization experiments are conducted under both size of trimer gold nanostructures, respectively. When the laser beam was irradiated on a single triangular trimer immersed in  $\text{NaClO}_3$  saturated solution, crystallization was realized at the laser focus.

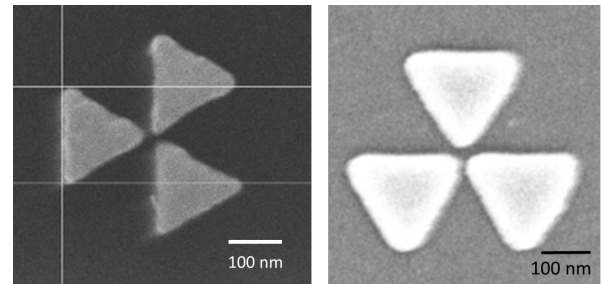


Figure 1. The SEM image of trimer gold nanostructures with edge length 170 nm (left) and 230 nm (right).

## 3. 結果と考察(Results and Discussion)

It was found that the distinctive difference in crystallization behavior between the experiments conducting with two size of trimer gold nanostructures. Compared with 170 nm trimer, longer crystallization and larger crystal size is observed when 230 nm trimer is used. Moreover, the polymorphic transition is never observed when 170 nm is using in the experiments. Based on the results, 230 nm trimer is found to be a better trimer gold nanostructure to induce the crystallization of  $\text{NaClO}_3$ . Further work will be done to elucidate the possible mechanism of this phenomena.

## 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。