

課題番号 : F-20-UT-0059  
利用形態 : 機器利用  
利用課題名(日本語) :  
Program Title (English) : Directional exciton diffusion in pentacene-decorated carbon nanotubes  
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キーワード/Keyword : リソグラフィ・露光・描画装置、carbon nanotubes, pentacene, lithography

## 1. 概要(Summary)

We demonstrate the directional exciton diffusion in pentacene-decorated carbon nanotubes.

## 2. 実験(Experimental)

### 【利用した主な装置】

高速大面積電子線描画装置、クリーンドラフト潤沢超純水付、高速シリコン深掘りエッチング装置、ステルスダイサー

### 【実験方法】

Electron-beam lithography and dry etching are used to pattern trenches on the Si wafer. SiO<sub>2</sub> film on the wafer is then formed by oxidation. Air-suspended carbon nanotubes are grown via chemical vapor deposition. Pentacene particles are then formed on the nanotubes via thermal evaporation. The optical properties of such nanotubes are characterized by a home-built photoluminescence system.

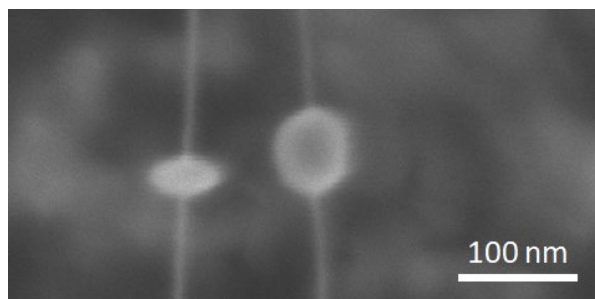


Fig. 1 Air-suspended carbon nanotubes decorated with pentacene particles.

## 3. 結果と考察(Results and Discussion)

Excitons diffuse from the pristine region to the pentacene-decorated site. Pentacene particles are found to enhance photon antibunching.

## 4. その他・特記事項(Others)

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

[1] Z. Li, K. Otsuka, D. Yamashita, and Y. K. Kato, “Directional exciton diffusion in pentacene-decorated carbon nanotubes”, 59th FNTG, Online, September 2020.

[2] Z. Li, K. Otsuka, D. Yamashita, and Y. K. Kato, “Directional exciton diffusion in pentacene-decorated carbon nanotubes”, JSAP-OSA Joint Symposia, 81st JSAP Autumn Meeting, Online, September 2020.

[3] Z. Li, K. Otsuka, and Y. K. Kato, “Molecular tuning of the optical properties in air-suspended carbon nanotubes”, PKU-Tsinghua-UTokyo Workshop on Nano Research, Tokyo, Japan, January 2020.

## 6. 関連特許(Patent)

なし