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利用課題名(日本語) :
Program Title (English) : Preparing individual SWNT-hBNNT heterostructure for electronic applications
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1. 概要(Summary)

To investigate transport properties of single-walled carbon nanotube (SWNT)-hexagonal boron nitride nanotube (hBNNT) heterostructure, an isolated suspending nanotube is preferable to exclude influences from neighboring nanotubes or substrate. Therefore, patterned catalyst clusters on isolated poles would effectively produce ideal individual suspending SWNT-hBNNT bridging two poles for examination.

2. 実験(Experimental)

【利用した主な装置】

高速大面積電子線描画装置, 超高速大面積電子線描画装置, 高速シリコン深掘りエッチング装置, 汎用ICPエッチング装置

【実験方法】

A marker layer was patterned by EBL (ADVANTEST F5112+VD01) and transferred to SiO₂/Si substrate by RIE (ULVAC CE-300I). The second layer for catalysts was patterned by EBL and then catalyst Co was sputtered onto. The third layer for poles was patterned by EBL as well, and the exposed area was etched away by RIE and DRIE (SPTS MUC-21) sequentially to produce several micrometer high poles for suspended SWNT growth and later SWNT-hBNNT heterostructure formation.

3. 結果と考察(Results and Discussion)

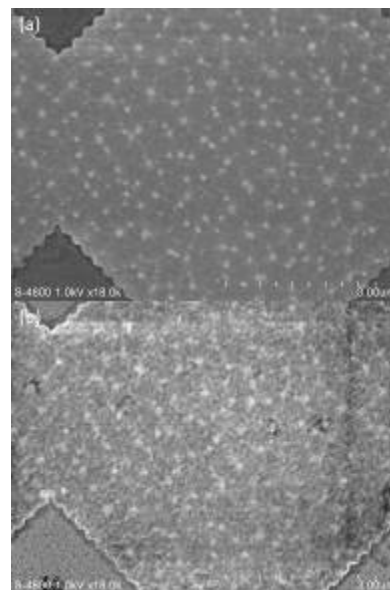


Fig. 1 SEM image of suspended individual (a) SWNT and (b) SWNT-hBNNT.

The desired individual SWNT-hBNNT heterostructure shown in Fig. 1 is ideal for optical characterization such as photoluminescence and Raman spectroscopy; it also can be dry-transferred onto substrate for further electrical and thermal measurements.

4. その他・特記事項(Others)

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5. 論文・学会発表(Publication/Presentation)

None

6. 関連特許(Patent)

None