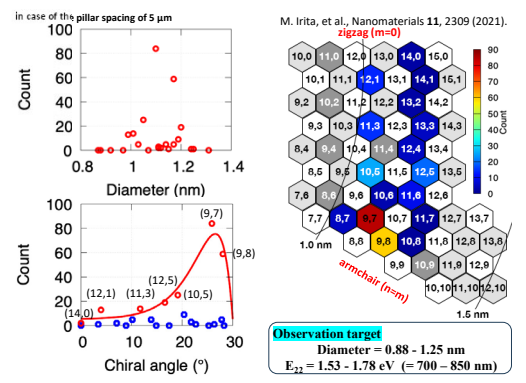
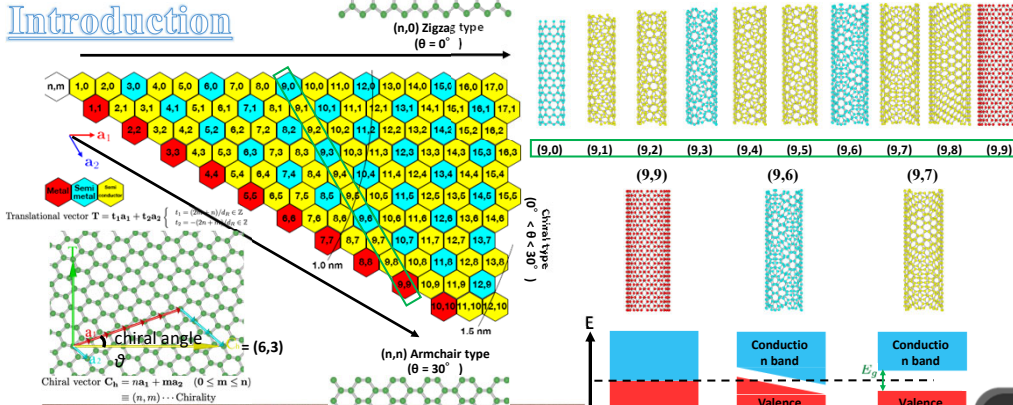


光励起発光分光法による単層カーボンナノチューブ熱伝導率の解析

研究推進機構 総合研究院 ナノカーボン研究部門

研究概要 ⇒ 単層カーボンナノチューブの基礎物性評価と応用

Introduction



Background in theory
Single-walled carbon nanotube (SWCNT):
Properties @ room temperature
Thermal conductivity λ:
[1] S. Berber et al., PRL, 84, 20, 4613, (2000).
[2] T. Yamamoto et al., Appl. Phys. Express, 2, 9, 2, (2009).

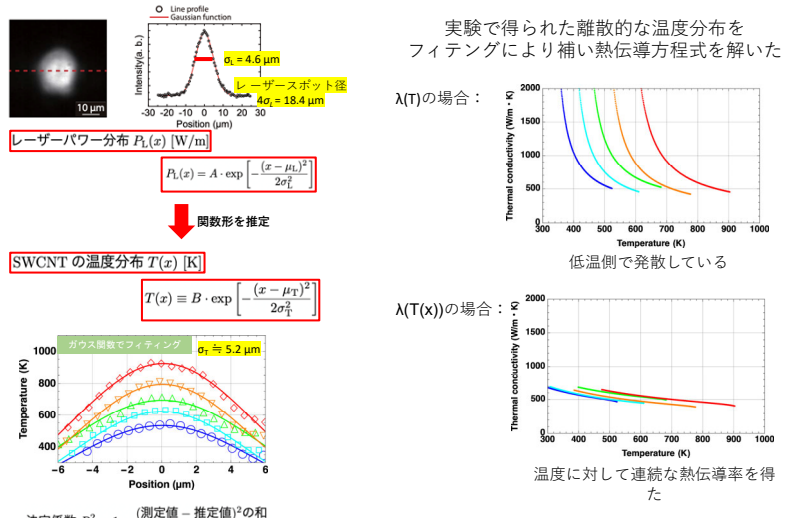
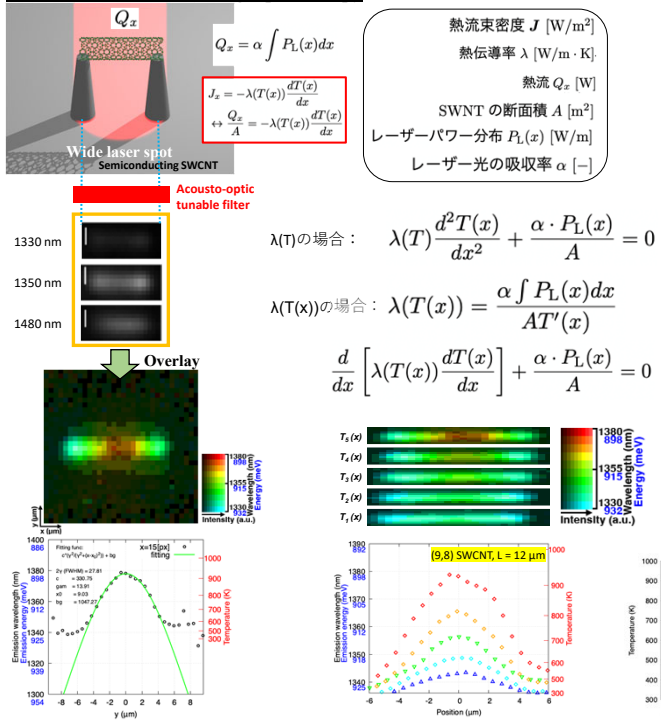
Objective

- For chirality-assigned, length fixed and isolated SWCNT @ room temperature
Observe the temperature distribution by non-contact optical measurement
Measure the structural dependence of thermal conductivity (Chirality, length, defect, ...)

Background in experimental
Thermal conductivity of individual SWCNT @ room temperature
Table with columns: Previous work, λ (W/m·K), (n,m), D (nm), Method.
Few studies evaluated SWCNT structure.

Results & Discussion

Photoluminescence (PL) image spectroscopy



Conclusion

We have demonstrated the possibility of clarifying the temperature dependence of the thermal conductivity of SWCNTs by this method.

研究開発成果

- 1. M. Irita, T. Yamamoto, and Y. Homma, Nanomaterials 11, 2309 (2021).
2. 出願番号: 特願2023-112654 発明の名称: 光伝送路、光アイソレーター、フォトニックデバイス、及び光伝送路の製造方法、出願日: 2023年7月7日
3. (論文執筆中) M. Irita, T. Yamamoto, and Y. Homma, Thermal Conductivity Analysis of Single-walled Carbon Nanotubes Based on Photoluminescence Imaging Spectroscopy.

今後の展開

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