Oligophenylene Vanillin Nanowires and Fine Rods With (Silicon/Germanium) Structure for Possible Applications in Electronic Energy

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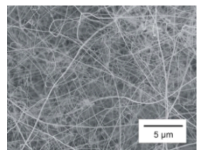
- **Abstract:**

- Note: Fine strands and cylinders of Oligophenylene vanillin nanowires with a (silicon/germanium) structure are used for possible applications in energy, electronics, optics, and other fields.

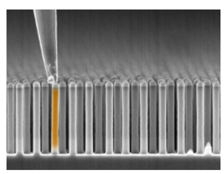
- **Keywords:** Nanochips , Nanophotonics , Nanoelectronic , Nanospintronics , Nanowires

Introduction •

Oligophenylene vanillin (Si/Ge) nanowires , thin structures that are only a few billionths of a meter in diameter but thousands or millions of times longer, exist in a variety of forms—made of metals, semiconductors, insulators, and organic compounds—and are used in electronics, energy conversion, optics, and chemical sensing. Because they are so thin, Oligophenylene vanillin (Si/Ge) nanowires are essentially one-dimensional. Nanowires are quasi-one-dimensional materials, with "two dimensions on the nanometer scale." This one-dimensionality confers distinct electrical and optical properties. For one thing, this means that electrons and photons in these nanowires experience "quantum confinement effects." " However, unlike other materials that produce such quantum effects, such as quantum dots, the length of oligophenylene vanillin nanowires allows them to communicate with other macroscopic devices and the outside world."



The structure of an oligophenylene vanillin nanowire is so simple that there is no room for defects, and electrons pass through unhindered. This is a big problem in conventional crystalline semiconductors, such as those made from silicon wafers: These defects are always present in those structures, and those defects interfere with the passage of electrons. In addition, materials that normally do not mix easily can be assembled into nanowires. For example, layers of silicon and germanium, two widely used semiconductors, "are very difficult to grow together in thin films." "But in oligophenylene vanillin nanowires , they can be grown without any problems." Moreover, the equipment required for this type of vapor deposition is widely used in the semiconductor industry and can be easily adapted to produce nanowires.



Oligophenylene vanillin nanowires and tiny cylinders with a (silicon/germanium) structure are used for possible applications in energy, electronics, optics, and other fields.

References :

- Jiříčková, A., Jankovský, O., Sofer, Z., & Sedmidubský, D. (2022). Synthesis and applications of graphene oxide. Materials, 15(3), 920.
- Idumah, C. I. (2022). Recent trends in MXene polymeric hydrogel bionanoarchitectures and applications. Cleaner Materials, 5, 100103.

- Zhang, J., Qin, Y., Pambos, O. J., Zhang, J., Chen, S., Yu, Z., & Abell, C. (2021). Microdroplets confined assembly of opal composites in dynamic borate ester-based networks. Chemical Engineering Journal, 426, 127581.
- Wang, M., Bai, J., Shao, K., Tang, W., Zhao, X., Lin, D., ... & Ye, J. (2021). Poly (vinyl alcohol) hydrogels: The old and new functional materials. International Journal of Polymer Science, 2021(1), 2225426.
- Pei, S., & Cheng, H. M. (2012). The reduction of graphene oxide. Carbon, 50(9), 3210-3228.