

Politecnico di Milano, Department of Energy, Cesnef (Building 19), via Ponzio 34/3, Milan

Friday, 12<sup>th</sup> June, 2020 – 10.00 a.m. (Italian Time)

(in teleconference at this link: [Join Microsoft Teams Meeting](#))

## Confined one-dimensional linear carbon chains

Lei Shi

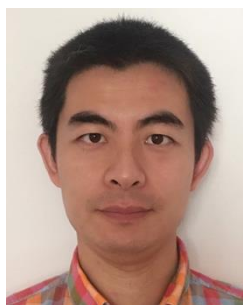
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Recently, we demonstrated synthesis of confined one-dimensional linear carbon chains (LCCs) inside double-walled carbon nanotubes (DWCNTs) with the shortest chains consisting of around 30 carbon atoms (polyyne) and the longest chains with a record length of more than 6000 carbon atoms (carbyne) [1]. The carbyne formation was confirmed by near-field Raman spectroscopy and its property was much tailored by its nanotube host [2,3]. Later on, we developed a method based on density gradient centrifugation to extract the LCCs and separate the short chains [4]. However, synthesis of specific length of long LCCs is still challenging. I will show our recent efforts on tailoring the length of the confined LCCs using different carbon nanotubes as hosts [5]. Also, a new method will be introduced to grow different length of LCCs monitored by in-situ Raman spectroscopy [6].

### References

- [1] L. Shi, et al. *Nature Mater.* 15, 634-639 (2016)
- [2] S. Heeg, et al. *Nano Lett.* 18, 5426-5431 (2018)
- [3] L. Shi, et al. *Phys. Rev. Materials* 1, 075601 (2017)
- [4] L. Shi, et al. *ACS Nano* 12, 8477-8484 (2018)
- [5] L. Shi, et al. In preparation (2020)
- [6] L. Shi, et al. In preparation (2020)

### About the speaker:



Lei Shi received his Ph.D. degree from the University of Vienna. After postdoctoral training at the University of Vienna for more than 3 years, he joined the Sun Yat-sen University as an associate professor since October 2018 to establish a research group named “1D NanoCarbons”. His research interests focus on the 1D carbon nanomaterials, including linear carbon chains, graphene nanoribbons, and carbon nanotubes. He gave talks in more than 40 conferences/groups, including 3 in the NT series conference. He published more than 30 peer-reviewed papers in the journals of *Nature Materials*, *ACS Nano*, *Physical Review Materials*, and so on.

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