

# Fabrication and TEM Characterization of New Nanostructures

## Project Leader

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## Objective

This project aims at fabrication of new inorganic nanostructures. Various types of nanostructures have been fabricated in our research group [1-4] using chemical vapor deposition and other growth methods. Ph.D. candidates are expected to fabricate new nanostructures and study their structure, formation mechanism and properties using transmission electron microscopy (TEM), scanning electron microscopy (SEM), and related analysis methods such as EDX and EELS.

## Project Outline

The project will undergo the following process.

- (1) Develop new fabrication system or fabrication procedure to find new nanostructures.
- (2) Analyze their structure.
- (3) Optimize fabrication parameters.
- (4) Measure their properties.

## Expected Performance

In this project, Ph.D. candidates are expected to publish four peer-reviewed journal papers as the first author and give presentations in international conferences during the three-year course.

## Required Skills and Knowledge

The successful candidate for this project will have the following knowledge and skills: materials science, crystallography, vacuum system, electron microscopy, English speaking and writing, programming and data analysis on Linux, and glass work. Applicants are also required to have at least one publication as the first author in a peer-reviewed international journal during his/her master course.

## References

- [1] "Multi-walled carbon nanotube growth in multi-walled carbon nanotubes by chemical vapor deposition", Takayuki Hasegawa, Daniel. J. Arenas, and Hideo Kohno, to be published in *Journal of Nanoscience and Nanotechnology*
- [2] "Formation of a carbon nanoribbon by spontaneous collapse of a carbon nanotube grown from a  $\gamma$ -Fe nanoparticle via an origami mechanism", Hideo Kohno, Takuya Komine, Takayuki Hasegawa, Hirohiko Niioka, and Satoshi Ichikawa, *Nanoscale* **5** (2013) 570.
- [3] "Carbon nanofoam formed by laser ablation", Hideo Kohno, Kentaro Tatsutani, and Satoshi Ichikawa, *Journal of Nanoscience and Nanotechnology* **12** (2012) 2844.
- [4] <http://www.scski.kochi-tech.ac.jp/kohno/>

## See our admission guidelines:

<https://www.kochi-tech.ac.jp/english/admission/ssp/guideline.html>

## Contact

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