



# AVVISO DI SEMINARIO

Il giorno 14/06/2023 alle ore 16:00  
nell'aula Seminari

Il Prof. **KOMATSU Naoki**

terrà un seminario dal titolo

**“Organic Chemistry for Carbon-Based Nanomaterials:  
Structural Discrimination and Functional Programming”**

Proponente: Prof. Lorenzo Stella

# Organic Chemistry for Carbon-Based Nanomaterials: Structural Discrimination and Functional Programming

KOMATSU Naoki

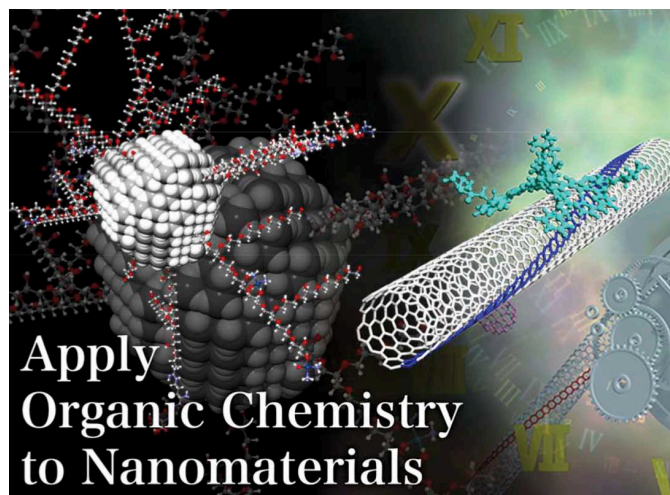
Graduate School of Human and Environmental Studies, Kyoto University, Sakyo-ku, Kyoto, Japan  
*komatsu.naoki.7w@kyoto-u.ac.jp*

## Abstract

Carbon-based nanomaterials have been attracting enormous interest for a wide variety of (potential) applications. Their sophisticated applications mostly require homogeneous properties due to the structural homogeneity and/or additional functions imparted through the structural decoration. In the former requirement, structure-based separation have been frequently employed rather than selective synthesis. We have applied **host-guest chemistry to discriminate the structures of carbon nanotubes** such as handedness and diameter as well as the properties such as metallicity [1]. In the latter one, various functional moieties such as hydrophilic polymer, targeting peptide and anticancer drug has been introduced on the nanomaterials through covalent bonding based on synthetic organic and coordination chemistry. **Biomedical nanodevice has been constructed by functional programming for cancer nanomedicine** [2].

## Publications

- [1] X. Peng, N. Komatsu,\* S. Bhattacharya, T. Shimawaki, S. Aonuma, T. Kimura, A. Osuka, *Nature Nanotechnology*, **2**, 361 (2007); F. Wang, K. Matsuda, A. F. M. M. Rahman, X. Peng, T. Kimura, N. Komatsu,\* *J. Am. Chem. Soc.*, **132**, 10876 (2010); G. Liu, F. Wang, S. Chunchaiyakul, Y. Saito, A. K. Bauri, T. Kimura, Y. Kuwahara, N. Komatsu,\* *J. Am. Chem. Soc.*, **135**, 4805 (2013); G. Liu, A. F. M. M. Rahman, S. Chunchaiyakul, T. Kimura, Y. Kuwahara, N. Komatsu,\* *Chem. Eur. J.*, **19**, 16221 (2013); G. Liu, Y. Saito, D. N.-Hamane, A. K. Bauri, E. Flahaut, T. Kimura, N. Komatsu,\* *J. Mater. Chem. A*, **2**, 19067 (2014); G. Liu, Y. Miyake, N. Komatsu,\* *Org. Chem. Front.*, **4**, 911 (2017); G. Cheng, T. Hayashi, Y. Miyake, T. Sato, H. Tabata, M. Katayama, N. Komatsu,\* *ACS Nano*, **16**, 12500 (2022).
- [2] L. Zhao, T. Takimoto, M. Ito, N. Kitagawa, T. Kimura, N. Komatsu,\* *Angew. Chem. Int. Ed.*, **50**, 1388 (2011); L. Zhao, T. Chano, S. Morikawa, Y. Saito, A. Shiino, S. Shimizu, T. Maeda, T. Irie, S. Aonuma, H. Okabe, T. Kimura, T. Inubushi, N. Komatsu,\* *Adv. Funct. Mater.*, **22**, 5107 (2012); L. Zhao, Y.-H. Xu, H. Qin, S. Abe, T. Akasaka, T. Chano, F. Watari, T. Kimura, N. Komatsu,\* X. Chen\* *Adv. Funct. Mater.*, **24**, 5348 (2014); G. Liu, H. Qin, T. Amano, T. Murakami, N. Komatsu,\* *ACS Appl. Mater. Interfaces*, **7**, 23402 (2015); F. Yoshino, T. Amano, Y. Zou, J. Xu, F. Kimura, Y. Furusho, T. Chano, T. Murakami, L. Zhao,\* N. Komatsu,\* *Small*, **15**, 1901930 (2019); Y. Zou, S. Ito, F. Yoshino, Y. Suzuki, L. Zhao, N. Komatsu,\* *ACS Nano*, **14**, 7216 (2020); Y. Zou, S. Ito, M. Fujiwara, N. Komatsu,\* *Adv. Funct. Mater.*, **32**, 2111077 (2022); Y. Wang, G. Reina, H. G. Kang, X. Chen, Y. Zou, Y. Ishikawa, M. Suzuki, N. Komatsu\* *Small*, **18**, 2204044 (2022); N. Komatsu\* *Acc. Chem. Res.*, **56**, 106 (2023).



Back cover at Y. Miyake, A. López-Moreno, J. Yang, H.-J. Xu, N. Desbois, C. P. Gros, N. Komatsu, *New J. Chem.*, **42**, 7592 (2018).

### **Short Biography**

Naoki Komatsu received his bachelor's, master's and doctor's degrees from Kyoto University in 1986, 1988 and 1993, respectively. He joined Okayama University in 1993 and moved to Kyoto University as assistant professor in 1994. In 1997, he worked at Florida State University as a visiting scholar for one year. In 2003, he moved from Kyoto University to Shiga University of Medical Science as associate professor. He was promoted to professor at Kyoto University in 2015. His research concept is to "apply organic chemistry to nanomaterials" including supramolecular chemistry for structural separation of nanocarbons and synthetic organic chemistry on inorganic nanoparticles for cancer nanomedicine.