

# Curriculum Vitae: Dr. Junbeom Park

Staff Scientist

Institute of Energy Technology - Fundamental Electrochemistry (IET - 1)

Forschungszentrum Jülich GmbH, Germany

Email: j.park@fz-juelich.de | Google Scholar | ORCID | Webpage

## Education

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### MS-Ph.D. integrated program, Chemical Engineering

Pohang University of Science and Technology (POSTECH)

- Thesis title: Structural Analysis of Carbon Nanotube Yarn
- Supervisor: Prof. Kun-Hong Lee

Mar. 2012 – Aug. 2017

Pohang, South Korea

### Bachelor, Chemical Engineering

Pohang University of Science and Technology (POSTECH)

Mar. 2008 – Feb. 2012

Pohang, South Korea

## Research Experiences

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### Staff Scientist

Forschungszentrum Jülich GmbH (FZJ)

- Institute of Energy Technology - Fundamental Electrochemistry (IET-1)
- Topic: Machine Learning-based analysis of electron microscopy data
- Skills: Image processing, Python, Machine Learning
- Supervisor: Dr. Shibabrata Basak

Jun. 2024 – present

Jülich, Germany

### Postdoctoral researcher

Forschungszentrum Jülich GmbH (FZJ)

- Institute of Energy and Climate - Fundamental Electrochemistry (IEK-9)
- Topic: Investigation of electrochemical mechanisms via in-situ TEM
- Skills: TEM, in-situ TEM, FIB/SEM
- Supervisor: Dr. Shibabrata Basak

Mar. 2020 – May. 2024

Jülich, Germany

### Postdoctoral researcher

Korea Institute of Science and Technology (KIST)

- Carbon Composite Materials Research Center
- Topic: Growth mechanism study of CNT through in-situ TEM
- Skills: TEM, in-situ TEM, FIB/SEM, Tensile testing
- Supervisor: Dr. Seung Min Kim

Mar. 2018 – Feb. 2020

Wanju, South Korea

### Researcher

Korea Institute of Science and Technology (KIST)

- Carbon Composite Materials Research Center
- Topic: Synthesis and mechanical behavior study of CNT fiber
- Skills: Process engineering, Tensile testing, FIB/SEM, TEM
- Supervisor: Dr. Seung Min Kim

Feb. 2017 – Feb. 2018

Wanju, South Korea

### Student researcher

Korea Institute of Science and Technology (KIST)

- Carbon Composite Materials Research Center
- Topic: Synthesis and mechanical behavior study of CNT fiber
- Skills: Process engineering, Tensile testing, Raman, SEM
- Supervisor: Dr. Seung Min Kim

Jul. 2014 – Dec. 2016

Wanju, South Korea

## References

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- Dr. Shibabrata Basak: (Supervisor: Post-doc.) Institute of Energy Technology - Fundamental Electrochemistry (IET - 1), Forschungszentrum Jülich GmbH, Germany [e-mail]
- Dr. Seung Min Kim: (Supervisor: Ph.D. & Post-doc.) Carbon Composite Materials Research Center, Korea Institute of Science and Technology, South Korea [e-mail]
- Prof. Kun-Hong Lee: (Supervisor: Ph.D.) Chemical Engineering, Pohang University of Science and Technology, South Korea [e-mail]
- Prof. Jaegeun Lee: (Colleague) Organic Material Science and Engineering, Pusan National University, South Korea [e-mail]

## Specialized Skills

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Techniques	Experiences
TEM	High resolution imaging, Electron diffraction, Aberration correction, 4D STEM, EDS and EELS
in-situ TEM	MEMS chip-based experiment: Heating, Biasing, Gas-Heating, Liquid-Biasing and Indentation
Data processing	Python based image processing (segmentation, edge detection), 4D STEM data analysis
FIB/SEM	Cross-section imaging, TEM lamella prep., Lamella designing, Lamella transfer to MEMS chip
Process engineering	Furnace, Gas flowing system, Sputter, Glove box, Plasma cleaner, cross-section polisher
Raman spectroscopy	Crystallinity qualification, Nanotube's diameter calculation, Alignment state determination
Tensile testing	Tensile strength measurement, Linear density measurement, Internal structure determination

## Research topics

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### 1. Analysis of reaction mechanisms via in-situ TEM

- Visualization of Zn electrodeposition via in-situ TEM and image processing [ref]
- Technical development of electron transparent Titanium Nitride electrode for in-situ liquid phase TEM [ref]
- Technical development to obtain high resolution of in-situ liquid phase TEM results [ref]
- Catalytic activity and agglomeration of catalyst particles near reaction temperature (around 1000 oC) [ref]

### 2. Analysis of structure and mechanical properties of material

- Intermediate formation of LATP/LFP (solid electrode/electrolyte) during sintering [ref]
- Arrangement of the graphitic structure of PAN-based carbon fiber during carbonization [ref]
- Structural evolution of industry-scaled carbon nanotube yarn during densification [ref]
- Mathematical model to relate between hierarchical structure and mechanical behavior of carbon nanotube fiber [ref]
- The effect of hierarchical structure on linear density measurement [ref]

### 3. Fabrication of high-strength carbon nanotube fiber via floating catalyst method [ref]

- Production parameters: Ratio of reactant, Temperature, Gas composition, Spinning rate
- Qualification methods: Strength (Tensile test), Morphology (TEM, SEM), Crystallinity (Raman analysis)

## Professional Experiences

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### Division Chair

The Korean Scientists and Engineers Association in the FRG (VeKNI)

- Division title: Materials

May 2024 – present

Bochum, Germany

### Session Chair

Europe - Korea Conference 2024 (EKC2024)

- Session title: [CM1] Advanced Characterization Techniques on Material Science

Aug. 2024

Coventry, United Kingdom

## Publications

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- Total number of papers including submitted: 38 (Main author papers: 9)
- H-index: 19 (From Google scholar, 2024.08.14)

### Key papers

1. **Toward Quantitative Electrodeposition via In Situ Liquid Phase Transmission Electron Microscopy: Studying Electroplated Zinc Using Basic Image Processing and 4D STEM** [ref]  
Junbeom Park, Sarmila Dutta, Hongyu Sun, Janghyun Jo, Pranav Karanth, Dieter Weber, Amir H. Tavabi, Yasin Emre Durmus, Krzysztof Dzieciol, Eva Jodat, André Karl, Hans Kungl, Yevheniy Pivak, H. Hugo Pérez Garza, Chandramohan George, Joachim Mayer, Rafal E. Dunin-Borkowski, Shibabrata Basak, Rüdiger-A. Eichel | *Small Methods* (2024) DOI:10.1002/smtd.202400081
2. **Titanium nitride microelectrode: a new candidate for in-situ electrochemical transmission electron microscopy study** [ref]  
Junbeom Park#, Ningyan Cheng#, Binghui Ge, Yevheniy Pivak, Hongyu Sun, H. Hugo Pérez Garz, Shibabrata Basak, Rüdiger-A. Eichel | *Advanced Engineering Materials* (2024) DOI:10.1002/adem.202302146 (#: Equal contribution)
3. **Structural Study of Polyacrylonitrile-Based Carbon Nanofibers for Understanding Gas Adsorption** [ref]  
Junbeom Park, Ansgar Kretzschmar, Victor Selmert, Osmane Camara, Hans Kungl, Hermann Tempel, Shibabrata Basak, Rüdiger A. Eichel | *ACS Applied Materials & Interfaces* 13 (2021) 46665
4. **Mathematical model for the dynamic behavior of carbon nanotube yarn in analogy with hierarchically structured bio-materials** [ref]  
Junbeom Park, Jaeyeun Lee, Dong-Myeong Lee, Sung-Hyun Lee, Hyeon Su Jeong, Kun-Hong Lee, Seung Min Kim | *Carbon* 152 (2019) 151

### A. List of research papers

1. **Titanium nitride microelectrode: a new candidate for in-situ electrochemical transmission electron microscopy study** [ref]  
Junbeom Park#, Ningyan Cheng#, Binghui Ge, Yevheniy Pivak, Hongyu Sun, H. Hugo Pérez Garz, Shibabrata Basak, Rüdiger-A. Eichel | *Advanced Engineering Materials* (2024) DOI:10.1002/adem.202302146 (#: Equal contribution)
2. **Towards quantitative electrodeposition via in-situ liquid phase Transmission Electron Microscopy: Studying Electroplated Zinc using Basic Image Processing and 4D STEM** [ref]  
Junbeom Park, Sarmila Dutta, Hongyu Sun, Janghyun Jo, Pranav Karanth, Dieter Weber, Amir H. Tavabi, Yasin Emre Durmus, Krzysztof Dzieciol, Hans Kungl, Yevheniy Pivak, H. Hugo Pérez Garza, Chandramohan George, Joachim Mayer, Rafal E. Dunin-Borkowski, Shibabrata Basak, Rüdiger-A. Eichel | *Small Methods* (2024) DOI:10.1002/smtd.202400081
3. **High-resolution and analytical electron microscopy in a liquid flow cell via gas purging** [ref]  
Yevheniy Pivak#, Junbeom Park#, Shibabrata Basak, Rüdiger-Albert Eichel, Anne Beker, Alejandro Rozene, Héctor Hugo Pérez Garza, Hongyu Sun | *Microscopy* 72 (2023) 520 (#: Equal contribution)
4. **Structural Study of Polyacrylonitrile-Based Carbon Nanofibers for Understanding Gas Adsorption** [ref]  
Junbeom Park, Ansgar Kretzschmar, Victor Selmert, Osmane Camara, Hans Kungl, Hermann Tempel, Shibabrata Basak, Rüdiger A. Eichel | *ACS Applied Materials & Interfaces* 13 (2021) 46665

5. **Deep-injection floating-catalyst chemical vapor deposition to continuously synthesize carbon nanotubes with high aspect ratio and high crystallinity** [ref]  
Sung-Hyun Lee+, Junbeom Park+, Ji Hong Park+, Dong-Myeong Lee+, Anna Lee, Sook Young Moon, Sei Young Lee, Hyeon Su Jeong, Seung Min Kim | *Carbon* 173 (2021) 901 (+: Equal contribution)
6. **Improving mechanical and physical properties of ultra-thick carbon nanotube fiber by fast swelling and stretching process** [ref]  
Dong-Myeong Lee+, Junbeom Park+, Jaegeun Lee, Sung-Hyun Lee, Shin-Hyun Kim, Seung Min Kim, Hyeon Su Jeong | *Carbon* 172 (2021) 733 (+: Equal contribution)
7. **Mathematical model for the dynamic behavior of carbon nanotube yarn in analogy with hierarchically structured bio-materials** [ref]  
Junbeom Park, Jaegeun Lee, Dong-Myeong Lee, Sung-Hyun Lee, Hyeon Su Jeong, Kun-Hong Lee, Seung Min Kim | *Carbon* 152 (2019) 151
8. **Accurate measurement of specific tensile strength of carbon nanotube fibers with hierarchical structures by vibroscopic method** [ref]  
Junbeom Park, Sung-Hyun Lee, Jaegeun Lee, Dong-Myeong Lee, Hayoung Yu, Hyeon Su Jeong, Seung Min Kim, Kun-Hong Lee | *RSC Advances* 7 (2017) 8575
9. **Carbon nanotube yarns** [ref]  
Junbeom Park, Kun-Hong Lee | *Korean Journal of Chemical Engineering* 29 (2012) 277
10. **Effect of Low Environmental Pressure on Sintering Behavior of NASICON-Type  $\text{Li}_{1.3}\text{Al}_{0.3}\text{Ti}_{1.7}(\text{PO}_4)_3$  Solid Electrolytes: An In Situ ESEM Study** [ref]  
Osmane Camara, Qi Xu, Junbeom Park, Shicheng Yu, Xin Lu, Krzysztof Dzieciol, Roland Schierholz, Hermann Tempel, Hans Kungl, Chandramohan George, Joachim Mayer, Shibabrata Basak, and Rüdiger-A. Eichel | *Crystal Growth & Design* 23 (2023) 1522
11. **Screening of Coatings for an All-Solid-State Battery using In Situ Transmission Electron Microscopy** [ref]  
Shibabrata Basak, Junbeom Park, Janghyun Jo, Osmane Camara, Amir H. Tavabi, Hermann Tempel, Hans Kungl, Chandramohan George, Rafal E. Dunin-Borkowski, Joachim Mayer, Rüdiger-A. Eichel | *Journal of Visualized Experiments* 191 (2023) e64316
12. **Active Interphase Enables Stable Performance for an All-Phosphate-Based Composite Cathode in an All-Solid-State Battery** [ref]  
Qi Xu, Zigeng Liu, Anna Windmüller, Shibabrata Basak, Junbeom Park, Krzysztof Dzieciol, Chih-Long Tsai, Shicheng Yu, Hermann Tempel, Hans Kungl, Rüdiger-A. Eichel | *Small* 18 (2022) 202200266
13. **Purification effect of carbon nanotube fibers on their surface modification to develop a high-performance and multifunctional nanocomposite fiber** [ref]  
Young-Kwan Kim, Young-Jin Kim, Junbeom Park, Sang Woo Han, Seung Min Kim | *Carbon* 173 (2021) 376
14. **Strong and Highly Conductive Carbon Nanotube Fibers as Conducting Wires for Wearable Electronics** [ref]  
Sung-Hyun Lee, Junbeom Park, Sook Young Moon, Sei Young Lee, Seung Min Kim | *ACS Applied Nano Materials* 4 (2021) 3833
15. **Continuous synthesis of high-crystalline carbon nanotubes by controlling the configuration of the injection part in the floating catalyst chemical vapor deposition process** [ref]  
Ji Hong Park, Junbeom Park, Sung-Hyun Lee, Seung Min Kim | *Carbon Letter* 30 (2020) 613
16. **Different thermal degradation mechanisms: Role of aluminum in Ni-rich layered cathode materials** [ref]  
Eunmi Jo, Jae-Ho Park, Junbeom Park, Jieun Hwang, Kyung Yoon Chung, Kyung-Wan Nam, Seung Min Kim, Wonyoung Chang | *Nano Energy* 78 (2020) 105367
17. **Bio-inspired incorporation of functionalized graphene oxide into carbon nanotube fibers for their efficient mechanical reinforcement** [ref]  
Young-Jin Kim, Junbeom Park, Cheol-Min Yang, Hyeon Su Jeong, Seung Min Kim, Sang Woo Han, Beomjoo Yang, Young-Kwan Kim | *Composite Science and Technology* 181 (2019) 107680

18. **Direct spinning and densification method for high-performance carbon nanotube fibers** [ref]  
Jaegeun Lee, Dong-Myeong Lee, Yeonsu Jung, Junbeom Park, Hun Su Lee, Young-Kwan Kim, Chong Rae Park, Hyeon Su Jeong, Seung Min Kim | *Nature Communications* 10 (2019) 2962
19. **Rationally designed catalyst layers toward “immortal” growth of carbon nanotube forests: Fe-ion implanted substrates** [ref]  
Cheol-Hun Lee, Jaegeun Lee, Junbeom Park, Eunyoung Lee, Seung Min Kim, Kun-Hong Lee | *Carbon* 152 (2019) 482
20. **A seed-mediated growth of gold nanoparticles inside carbon nanotube fibers for fabrication of multifunctional nanohybrid fibers with enhanced mechanical and electrical properties** [ref]  
Young-Jin Kim, Junbeom Park, Hyeon Su Jeong, Min Park, Seulki Baik, Dong Su Lee, Heesuk Rho, Hyungjun Kim, Joong Hee Lee, Seung-Min Kim, Young-Kwan Kim | *Nanoscale* 11 (2019) 5295
21. **CNT bundle-based thin intracochlear electrode array** [ref]  
Gwang Jin Choi, Tae Mok Gwon, Doo Hee Kim, Junbeom Park, Seung Min Kim, Seung Ha Oh, Yoonseob Lim, Sang Beom Jun, Sung June Kim | *Biomedical Microdevices* 21 (2019) 27
22. **Simultaneous enhancement of mechanical and electrical properties of carbon nanotube fiber by infiltration and subsequent carbonization of resorcinol-formaldehyde resin** [ref]  
Young-Jin Kim, Junbeom Park, Hyungjun Kim, Hyeon Su Jeong, Joong Hee Lee, Seung Min Kim, Young-Kwan Kim | *Composite Part B: Engineering* 163 (2019) 431
23. **Synthesis mechanism of carbon nanotube fibers using reactor design principles** [ref]  
Sung-Hyun Lee, Hye-Rim Kim, Haemin Lee, Jinwoo Lee, Cheol-Hun Lee, Jaegeun Lee, Junbeom Park, Kun-Hong Lee | *Chemical Engineering Science* 192 (2019) 431
24. **Improved Mechanical and Electrical Properties of Carbon Nanotube Yarns by Wet Impregnation and Multi-ply Twisting** [ref]  
Yu Ri Lee, Junbeom Park, Youngjin Jeong, Jong S. Park | *Fibers and Polymers* 19 (2018) 2478
25. **Hierarchical structure of carbon nanotube fibers, and the change of structure during densification by wet stretching** [ref]  
Hyunjung Cho, Haemin Lee, Eugene Oh, Sung-Hyun Lee, Junbeom Park, Hyun Jin Park, Suk-Bae Yoon, Cheol-Hun Lee, Gye-Hoon Kwak, Won Jae Lee, Juhan Kim, Ji Eun Kim, Kun-Hong Lee | *Carbon* 136 (2018) 409
26. **Metal nanofibrils embedded in long free-standing carbon nanotube fibers with a high critical current density** [ref]  
Hokyun Rho, Min Park, Mina Park, Junbeom Park, Jiyeon Han, Aram Lee, Sukang Bae, Tae-Wook Kim, Jun-Seok Ha, Seung Min Kim, Dong Su Lee, Sang Hyun Lee | *NPG Asia Materials* 10 (2018) 146
27. **Effects of Wet-Pressing and Cross-Linking on the Tensile Properties of Carbon Nanotube Fibers** [ref]  
Hyunjung Cho, Jinwoo Lee, Haemin Lee, Sung-Hyun Lee, Junbeom Park, Cheol-Hun Lee, Kun-Hong Lee | *Materials* 11 (2018) 2170
28. **Photoacoustic effect on the electrical and mechanical properties of polymer-infiltrated carbon nanotube fiber/graphene oxide composites** [ref]  
Ki-Ho Nam, Yong-O. Im, Hye Jin Park, Haena Lee, Junbeom Park, Sunho Jeong, Seung Min Kim, Nam-Ho You, Jae-Hak Choi, Haksoo Han, Kun-Hong Lee, Bon-Cheol Ku | *Composites Science and Technology* 153 (2017) 136
29. **Synthesis of carbon nanotube fibers from carbon precursors with low decomposition temperatures using a direct spinning process** [ref]  
Sung-Hyun Lee, Hye-Rim Kim, Taeseon Lee, Haemin Lee, Jinwoo Lee, Jaegeun Lee, Junbeom Park, Kun-Hong Lee | *Carbon* 124 (2017) 219
30. **Utilization of carboxylic functional groups generated during purification of carbon nanotube fiber for its strength improvement** [ref]  
Yong-O. Im, Sung-Hyun Lee, Teawon Kim, Junbeom Park, Jaegeun Lee, Kun-Hong Lee | *Applied Surface Science* 392 (2017) 342

31. **Synthesis of carbon nanotube fibers using the direct spinning process based on Design of Experiment (DOE)** [ref]  
Sung-Hyun Lee, Junbeom Park, Hye-Rim Kim, Taeseon Lee, Jaegeun Lee, Yong-O. Im, Cheol-Hun Lee, Hyunjung Cho, Hyeseon Lee, Chi-Hyuck Jun, Yu-Chan Ahn, In-Beum Lee, Kun-Hong Lee | *Carbon* 100 (2016) 647
  32. **High-strength carbon nanotube/carbon composite fibers via chemical vapor infiltration** [ref]  
Jaegeun Lee, Teawon Kim, Yeonsu Jung, Kihoon Jung, Junbeom Park, Dong-Myeong Lee, Hyeon Su Jeong, Jun Yeon Hwang, Chong Rae Park, Kun-Hong Lee, Seung Min Kim | *Nanoscale* 8 (2016) 18972
  33. **Effects of a SiO<sub>2</sub> sub-supporting layer on the structure of a Al<sub>2</sub>O<sub>3</sub> supporting layer, formation of Fe catalyst particles, and growth of carbon nanotube forests** [ref]  
Jaegeun Lee, Cheol Hun Lee, Junbeom Park, Dong-Myeong Lee, Kun-Hong Lee, Sae Byeok Jo, Kilwon Cho, Benji Maruyama, Seung Min Kim | *RSC Advances* 6 (2016) 68424
  34. **Improving the tensile strength of carbon nanotube yarn via one-step double [2+1] cycloadditions** [ref]  
HeeJin Kim, Jaegeun Lee, Byungrak Park, Jeong-Hoon Sa, Alum Jung, Teawon Kim, Junbeom Park, Woonbong Hwang, Kun-Hong Lee | *Korean Journal of Chemical Engineering* 33 (2016) 299
  35. **The influence of boundary layer on the growth kinetics of carbon nanotube forests** [ref]  
Jaegeun Lee, Eugene Oh, Teawon Kim, Jeong-Hoon Sa, Sung-Hyun Lee, Junbeom Park, Dustin Moon, In Seok Kang, Myung Jong Kim, Seung Min Kim, Kun-Hong Lee | *Carbon* 93 (2015) 217
  36. **Synthesis of high-quality carbon nanotube fibers by controlling the effects of sulfur on the catalyst agglomeration during the direct spinning process** [ref]  
Sung-Hyun Lee, Junbeom Park, Hye-Rim Kim, Jaegeun Lee, Kun-Hong Lee | *RSC Advances* 5 (2015) 41894
  37. **(Korean) Enhancement of the Mechanical Properties of CNT Fibers Synthesized by Direct Spinning Method with Various Post-Treatments** [ref]  
Jin-seok Kim, Junbeom Park, Seung Min Kim, L. K. Kwac, Jun Yeon Hwang | *Composites Research* 28 (2015) 239
  38. **The reason for an upper limit to the height of spinnable carbon nanotube forests** [ref]  
Jaegeun Lee, Eugene Oh, Hye-Jin Kim, Seungho Cho, Teawon Kim, Sunghyun Lee, Junbeom Park, Hee Jin Kim, Kun-Hong Lee | *Journal of Materials Science* 48 (2013) 6897
- B. List of patents
1. **Apparatus for continuously producing carbon nanotubes** [ref]  
Seung Min Kim, Sung Hyun Lee, Jun Beom Park, Ji Hong Park, Dong Myeong Lee, Sook Young Moon, Hyeon Su Jeong | *US 11,332,372 B2, KR10-2019-0170412*
  2. **Method for continuous manufacture of CNTF having high strength and high conductivity** [ref]  
Seung Min Kim, Hyeon Su Jeong, Jae Geun Lee, Dong Myeong Lee, Hun Su Lee, Young Kwan Kim, Jun Beom Park | *US 10,246,333 B1, KR 10-1972987*
  3. **Apparatus for manufacturing CNT and Method of manufacturing CNT using the same** [ref]  
Seung Min Kim, Hanbin Park, Sook Young Moon, Hyeon Su Jeong, Young Kwan Kim, Jun Beom Park | *KR 10-1981675*
  4. **Production method of high performance carbon nano tube/carbon composite fiber and carbon nanotube/carbon composite fiber thereby** [ref]  
Seung Min Kim, Jae Geun Lee, Dong Myeong Lee, Jun Beom Park, Jun Yeon Hwang, Hyeon Su Jeong | *KR 10-1726823*

## Presentations

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### A. Seminar and Lecture presentations (5)

1. (Seminar) **Toward Live processing on in-situ TEM**  
Junbeom Park  
VeKNI (The Korean Scientists and Engineers Association in Germany) Region 5 Workshop, 2024, Aachen, Germany

2. (Lecture) **Semiconductor analysis equipment (Ch.x Advanced STEM, Ch.x in-situ TEM)**  
Junbeom Park  
 Semiconductor Process and Equipment Contract department, Pusan National University (PNU),  
 2024, Busan, Korea
3. (Seminar) **The impact of data processing on material research**  
Junbeom Park  
 Institute of Advanced Composite Materials, Korea Institute of Science and Technology (KIST)  
 Jeonbuk, 2023, Wanju, Korea
4. (Seminar) **In-situ transmission electron microscopy**  
Junbeom Park  
 VeKNI (The Korean Scientists and Engineers Association in Germany) Region 5 Workshop, 2023,  
 Aachen, Germany
5. (Seminar) **Accurate measurement of linear density via Favimat+**  
Junbeom Park  
 Institute of Advanced Composite Materials, Korea Institute of Science and Technology (KIST)  
 Jeonbuk, 2017, Wanju, Korea

B. Further presentations at conferences (4)

1. (Conference) **In-situ Transmission Electron Microscopy and Image Processing**  
Junbeom Park, Hongyu Sun, Janghyun Jo, Shibabrata Basak, Rüdiger-A. Eichel  
 Europe-Korea Conference on Science and Technology 2023 (EKC2023), 2023, Munich,  
 Germany
2. (Conference) **FIB-based lamella preparation for in-situ TEM gas experiment**  
Junbeom Park, Osmane Camara, Hermann Tempel, Hans Kungl, Shibabrata Basak, Rüdiger-A.  
 Eichel  
 16th Multinational Congress on Microscopy, 2022, Brno, Czech Republic
3. (Conference) **Theoretical model for structure determination of hierarchically structured carbon nanotube yarn**  
Junbeom Park, Jaegun Lee, Sung-Hyun Lee, Kun-Hong Lee and Seung Min Kim  
 Carbon 2018 World Conference, 2018, Madrid, Spain
4. (Conference) **Proper linear density measurement method of hierarchical structural carbon nanotube fibers by vibroscope**  
Junbeom Park, Sung-Hyun Lee, Jaegun Lee, Dong-Myeong Lee, Seung Min Kim and  
 Kun-Hong Lee  
 2016 spring meeting of the Korean Carbon Society, 2016, Gumi, Korea

C. Poster contributions (17)

1. (Conference) **Data processing of in-situ TEM toward live processing**  
Junbeom Park, Hongyu Sun, Janghyun Jo, Eva Jodat, André Karl, Shibabrata Basak, Rüdiger-A.  
 Eichel  
 PICO2024, 2024, Vaals, Netherlands
2. (Conference) **Improving the knowledge from in-situ Liquid Phase TEM via image processing**  
Junbeom Park, Hongyu Sun, Janghyun Jo, Shibabrata Basak, Rüdiger-A. Eichel  
 The 20th International Microscopy Congress (IMC20), 2023, Busan, Korea
3. (Conference) **Understanding gas adsorption of PAN-based carbon nanofibers**  
Junbeom Park, Ansgar Kretzschmar, Victor Selmert, Osmane Camara, Hans Kungl, Hermann  
 Tempel, Shibabrata Basak, Rüdiger-A. Eichel  
 PICO 2022, 2022, Kasteel Vaalsbroek, The Netherlands
4. (Conference) **Mathematical model for dynamic mechanical behavior of carbon nanotube yarns in analogy with hierarchically structured bio-materials**  
Junbeom Park, Jaegun Lee, Dong-Myeong Lee, Sung-Hyun Lee, Hyeon Su Jeong, Kun-Hong  
 Lee and Seung Min Kim  
 2019 spring meeting of the Korean Carbon Society, 2019, Daegu, Korea
5. (Conference) **The effect of weak oxidant on the synthesis of carbon nanotube fiber**  
Junbeom Park, Hanbin Park, Sung-Hyun Lee and Seung Min Kim  
 2018 spring meeting of the Korean Carbon Society, 2018, Gwangju, Korea

6. (Conference) **Effect of Water on Synthesis of Carbon Nanotube by Floating Catalyst Method**  
Junbeom Park, Hanbin Park, Jaegeun Lee, Dong-Myeong Lee and Seung Min Kim  
The 23rd Nanotube research group, 2018, Muju, Korea
7. (Conference) **The effect of spinning rate during the fabrication of carbon nanotube fibers**  
Junbeom Park, Jaegeun Lee, Hanbin Park, Dong-Myeong Lee, Kun-Hong Lee and Seung Min Kim  
2017 spring meeting of the Korean Carbon Society, 2017, Changwon, Korea
8. (Conference) **Characterization of carbon nanotube fibers from the hierarchical viewpoint**  
Junbeom Park, Jaegeun Lee, Dong-Myeong Lee, Hanbin Park, Kun-Hong Lee and Seung Min Kim  
2017 spring meeting of KICHe, 2017, Jeju, Korea
9. (Conference) **The effect of carrier gas flow rate on properties of carbon nanotube fibers**  
Junbeom Park, Sung-Hyun Lee, Seung Min Kim and Kun-Hong Lee  
China NANO 2015, 2015, Beijing, China
10. (Conference) **The effect of carrier gas flow rate on the synthesis of CNT fibers by direct spinning method**  
Junbeom Park, Sung-Hyun Lee, Jinseok Kim, Seung Min Kim and Kun-Hong Lee  
2015 spring meeting of the Korean Carbon Society, 2015, Gumi, Korea
11. (Conference) **The effect of sulfur and IR heating on the carbon nanotube (CNT) fibers**  
Junbeom Park, Sung-Hyun Lee, Jinseok Kim, Seojeong Jeong, Seung Min Kim and Kun-Hong Lee  
2014 fall meeting of the Korean Carbon Society, 2014, Jeonju, Korea
12. (Conference) **The effect of thiophene concentration during synthesizing the carbon nanotube (CNT) fibers**  
Junbeom Park, Sung-Hyun Lee, Seojeong Jeong, Jinseok Kim, Seung Min Kim and Kun-Hong Lee  
2014 Fall meeting of KICHe, 2014, Daejeon, Korea
13. (Conference) **Surface analysis of carbon nanotube (CNT) yarns after acid treatment**  
Junbeom Park, Sung-Hyun Lee and Kun-Hong Lee  
2013 fall meeting of the Korean Carbon Society, 2013, Jeonju, Korea
14. (Conference) **Acid treatment on synthesized carbon nanotube yarns from methane**  
Junbeom Park, Sung-Hyun Lee and Kun-Hong Lee  
2013 Fall meeting of KICHe, 2013, Daegu, Korea
15. (Conference) **Dipping carbon nanotube (CNT) yarns in various acids for chemical treatment**  
Junbeom Park, Sung-Hyun Lee and Kun-Hong Lee  
2013 Spring meeting of the Korean Carbon Society, 2013, Seoul, Korea
16. (Conference) **Changes of carbon nanotube (CNT) yarns surface after acid treatment**  
Junbeom Park, Sung-Hyun Lee and Kun-Hong Lee  
2013 Spring conference of the Korean Fiber Society, 2013, Daegu, Korea
17. (Conference) **urification of carbon nanotube (CNT) fibers with acid treatment**  
Junbeom Park, Sung-Hyun Lee and Kun-Hong Lee  
2013 KICHe winter season workshop, 2013, Muju, Korea