Nokyoung Park

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Education

- **Ph.D.** Analytical Chemistry
  POSTECH (Pohang University of Science and Technology, South Korea),
  Feb. 2004
  Advisor: Jong Hoon Hahn
  Dissertation title: Development of Electrochemical Detection Method for DNA Hybridization and Continuous DNA Amplification Microdevices.

- **M.S.** Analytical Chemistry
  POSTECH (Pohang University of Science and Technology, South Korea),
  Feb. 1998
  Thesis title: Development of a Method for Cutting Single DNA Molecules Using Capillary Micropipette.

- **B.S.** Chemistry
  POSTECH (Pohang University of Science and Technology, South Korea),
- Feb. 1996

Employment

- **Professor**
  Dept. Chemistry, Myongji University
  Mar 2015-Present

- **Program Director**
  Samsung Research Funding Center for Future Technology, Samsung Electronics
  Jan 2014-Feb 2015

- **R&D Staff Member**
  Frontier Research Lab., Samsung Advanced Institute of Technology, Samsung Electronics, South Korea, July 2010-Jan 2014

- **Research Associate and Postdoctoral Researcher**
  Department of Biological and Environmental Engineering, Cornell University,

Ithaca, New York, Sep 2005-June 2010

- **Postdoctoral Researcher**
  Department of Chemistry, Texas A&M University, College Station, Texas,
  Feb 2005-Aug 2005

- **Postdoctoral Researcher**
  Department of Chemistry, POSTECH (Pohang University of Science and Technology), Pohang, South Korea, Feb 2004-Jan 2005

Publications

At Myongji University

1. M Lee, M Lee, S Kim, **N Park*** "Stimuli-Responsive DNA Hydrogel Design Strategies for Biomedical Applications", **Biosensors**, 2025, 15(6).
2. M Lee, J Hwang, Y Song, M Kim, S Kim, **N Park*** "Anti-miR21-conjugated DNA nanohydrogel for enhanced cancer therapy", **Biomaterials Advances**, 2024, 169.
3. M Lee, Y Song, M Lee, M Kim, S Kim, **N Park*** "Recent advances and prospects of Nucleic Acid Therapeutics for anti-cancer Therapy", **Molecules**, 2024, 29(19).
4. M Lee, M Lee, M Kim, S Kim, **N Park*** "Nanosized DNA hydrogel functionalized with a DNAzyme tetrahedron for highly efficient gene silencing", **Biomacromolecules**, 2024, 25(8).
5. MZ Quazi, J Choi, M Kim, **N Park*** "DNA and Nanomaterials: A Functional Combination for DNA Sensing", **ACS applied bio materials**, 2024, 7(2).
6. M Lee, S Shin, S Kim, **N Park*** "Recent Advances in Biological Applications of Aptamer-Based Fluorescent Biosensors", **Molecules**, 2023, 28(21).
7. M Lee, S Kang, S Kim, **N Park*** "Advances and Trends in miRNA Analysis Using DNAzyme-Based Biosensors", **Biosensors**, 2023, 13(9).
8. MZ Quazi, J. Hwang, Y. Song, **N Park*** "Hydrogel-Based Biosensors for Effective Therapeutics", ***Gels***, 2023, 9(7), 545.
9. MZ Quazi, J. Park, **N Park*** "Phototherapy: A Conventional Approach to Overcome the Barriers in Oncology Therapeutics", ***Technology in Cancer Research & Treatment***, 2023, 22, 1-6.
10. MZ Quazi, **N Park*** "DNA Hydrogel-Based Nanocomplexes with Cancer-Targeted Delivery and Light-Triggered Peptide Drug Release for Cancer-Specific Therapeutics", ***ACS Biomacromolecules***, 2023, 24(5), 2127-2137.

11. JS Kim, J. Park, JH Choi, S. Kang, **N Park*** "RNA–DNA hybrid nano-materials for highly efficient and long lasting RNA interference effect", ***RSC advances***, 2023, 13, 3139-3146.
12. MZ Quazi, T. Kim, J. Yang, **N Park*** "Tuning plasmonic properties of gold nanoparticles by employing nanoscale DNA hydrogel scaffolds", ***Biosensors***, 2023, 13(1), 20.
13. MZ Quazi, **N Park*** "Nanohydrogels: Advanced polymeric nanomaterials in the era of nanotechnology for robust functionalization and cumulative applications", ***International Journal of Molecular Sciences***, 2022, 23(4), 1943.
14. MZ Quazi, U Lee, S Park, S Shin, E Sim, H Son, **N Park*** "Cancer Cell-Specific Enhanced Raman Imaging and Photothermal Therapeutic Effect Based on Reversibly pH-Responsive Gold Nanoparticles", ***ACS Applied Bio Materials***, 2021, 4 (12), 8377-8385.
15. BJ Kwak, H Kim, **N Park***, JH Hahn* "Microchip for continuous DNA analysis based on gel electrophoresis coupled with co-injection of size markers and in-channel staining", ***Analytical and Bioanalytical Chemistry***, 2021, 413 (23), 5685-5694.
16. S Park, WJ Lee, S Park, D Choi, S Kim, **N Park*** "Reversibly pH-responsive gold nanoparticles and their applications for photothermal cancer therapy", ***Scientific reports***, 2019, 9 (1), 1-9.
17. J. Song, M. Lee, J. Na, T. Kim, Y. Jung, G. Y. Jung, S. Kim, **N. Park*** "A RNA producing DNA hydrogel as a platform for a high performance RNA interference system", ***Nature Communications***, 2018, 9:4331. (IF: 12.353)
18. J. Song, S. Park, S. Kim, K. Im, **N. Park*** "Electrostatic interaction driven gold nanoparticle assembly on three-dimensional triangular pyramid DNA nanostructures", ***New J. Chem***., 2017, 41, 9590-9593. (IF: 3.201)
19. T. G. Kim[1], **N. Park[1]**, U. J. Kim, J. Hur* "Electrical modulation of grapheme by the self-assembly of DNA-functionalized gold nanoparticles", ***J. Nanosci. Nanotechnol.,*** 2017, 17, 8007-8011. ([1]Equal contribution) (IF: 1.354)
20. H. Kim, S. Suk, K. Lim, **N. Park***, J. H. Hahn* "Continuous-Flow Microfluidic Device for Real-Time Polymerase Chain Reaction", ***Bull. Korean Chem. Soc.***, 2016, 37, 1878-1881. (IF: 0.522)
21. H. Kim, **N. Park**, J. H. Hahn* "Parallel-processing continuous-flow device for optimization-free polymerase chain reaction", ***Anal Bioanal Chem***, 2016, 408, 6751-6758. (IF: 3.303)
22. T. Kim, S. Park, M. Lee, S. Baek, J. B. Lee, **N. Park*** "DNA hydrogel microspheres and their potential applications for protein delivery and live cell monitoring", ***Biomicrofluidics***, 2016, 10, 034112. (IF: 2.571)

23. J. Song, K. Im, S. Hwang, S. Park, T. Kim, K. Im, J. Hur, J. Nam, S. Kim*, **N. Park*** "DNA templated Synthesis of Branched Gold Nanostructures with Highly Efficient Near-infrared Photothermal Therapeutic Effect", ***RSC Advances***, 2016, 6, 51658-51661. (IF: 2.936)
24. **N. Park,** S. C. Chae, I. T. Kim*, J. Hur* "Fabrication of Self-Healable and Patternable Polypyrrole/Agarose Hybrid Hydrogels for Smart Bioelectrodes", ***J. Nanosci. Nanotechnol.,*** 2016, 16, 1400-1404. (IF: 1.354)
25. J. Song, K. Im, S. Hwang, J. Hur, J. Nam, S. Hwang, S. Kim*, **N. Park*** "DNA Hydrogel Delivery Vehicle for Light-triggered and Synergistic Cancer Therapy", ***Nanoscale,*** 2015,7, 9433-9437. (IF: 7.233)

Before Myongji University

26. J. Song, K. Im, S. Hwang, J. Hur, J. Nam, S. Hwang, S. Kim*, **N. Park*** "Light-responsible DNA hydrogel-gold nanoparticle assembly for synergistic cancer therapy", ***J. Mater. Chem. B,*** 2015, 3, 1537-1543. (IF: 4.776)
27. J. Hur, K. Im, S. W. Kim, J. Kim, D. Chung, T. Kim, K. H. Jo, J. H. Hahn, Z. Bao, S. Hwang, **N. Park*** "Polypyrrole/Agarose-Based Electronically Conductive and Reversibly Restorable Hydrogel", ***ACS Nano,*** 2014, 8, 10066-10076. (IF: 13.709)
28. J. Hur, K. Im, U. J. Kim, T. Kim, J. Park*, **N. Park*** "Inverted hybrid photovoltaic devices on nonplanar surface for efficient charge carrier separation", ***Japanese Journal of Applied Physics***, 2014, **53**, *05HB01*. (IF: 1.452)
29. J. Park, J. Song, J. Park, **N. Park***, S. Kim* "Branched DNA-based Synthesis of Fluorescent Silver Nanocluster", ***Bull. Korean Chem. Soc***. 2014, 35, 1105-1109. (IF: 0.522)
30. S. Hwang, J. Nam, J. Song, S. Jung, J. Hur, K. Im, **N. Park**, S. Kim* "A sub 6 nanometer plasmonic gold nanoparticle for pH-responsive near-infrared photothermal cancer therapy", ***New J. Chem***., 2014, 38, 918-922. (IF: 3.201)
31. K. Im, D. Jeong, J. Hur, S. Hwang, K. Jin*, **N. Park***, K. Kim "Robust analysis of synthetic label-free DNA junctions in solution by X-ray scattering and molecular simulation", **NPG *Scientific Reports,*** 2013, 3, 3226; DOI:10.1038/srep03226. (IF: 4.122)
32. J. Hur, K. Im, S. W. Kim, U. J. Kim, S. Hwang, J. Song, S. Kim, S. Hwang, **N. Park*** "DNA hydrogel templated carbon nanotube and polyaniline assembly and its applications for electrochemical energy storage devices", ***J. Mater. Chem. A,*** 2013, 1, 14460-14466. (IF: 9.931)

33. J. H. Lee, **N. Park**, B. G. Kim, D. S. Jung, K. Im, J. Hur*, J. W. Choi* "Restacking-Inhibited 3D Reduced Graphene Oxide for High Performance Supercapacitor Electrodes", ***ACS Nano***, 2013, 7, 9366-9374. (IF: 13.709)

34. U. J. Kim, J. Hur, S. Cheon, D. Y. Chung, H. Son, Y. Park, Y. G. Roh, J. E. Kihm, J. Lee, S. W. Kim, K. Im, **N. Park**, J. Kim, W. Park* and C. W. Lee* " Enhancement of integrity of graphene transferred by interface energy modulation", ***Carbon,*** 2013, 65, 165-174. (IF: 7.082)

35. S. Jung, J. Nam, S. Hwang, J. Park, J. Hur, K. Im, **N. Park**, S. Kim* "Theragnostic pH-sensitive Gold Nanoparticles for the Selective Surface Enhanced Raman Scattering and Photothermal Cancer Therapy", ***Anal. Chem***., 2013, 85, 7674–7681. (IF: 6.042)

36. J. Nam, W. La, S. Hwang, Y. S. Ha, **N. Park**, N. Won, S. Jung, S. H. Bhang, Y. Ma, Y. Cho, M. Jin, J. Han, J. Shin, E. K. Wang, S. G. Kim, S. Cho, J. Yoo, B. Kim*, S. Kim* "pH-Responsive Assembly of Gold Nanoparticles and "Spatiotemporally Concerted" Drug Release for Synergistic Cancer Therapy" ***ACS Nano***, 2013, 7, 3388-3402. (IF: 13.709)

37. J. Hur, K. Im, S. Hwang, B. Choi, S. Hwang, S. Kim, **N. Park***, K Kim "DNA hydrogel-based supercapacitors operating in physiological fluids" **NPG** ***Scientific Reports,*** 2013, doi:10.1038/srep01282. (IF: 4.122)

38. J. B. Lee, S. Peng, D. Yang, Y. H. Roh, H, Funabashi, **N. Park**, E. J. Rice, L. Chen, R. Long, M. Wu, D. Luo* "A mechanical metamaterial made from a DNA hydrogel" ***Nature Nanotechnol.,*** 2012, 7, 816–820. (IF: 37.490)

39. J. Nam, H. Nam, S. Jung, S. Hwang, T. Wang, J. Hur, K. Im, **N. Park**, K. H. Kim, S. Kim* "Unique Photothermal Response and Sustained Photothermal Effect of pH-Responsive Gold-Nanoparticle Aggregates" ***ChemPhysChem***, 2012, 13, 4105-4109. (IF: 2.947)

40. R. Velu, S. Jung, J. Hur, S. Kim*, **N Park*** "Fluorescence enhancement and end-to-end assembly of bisacridinedione-functionalized gold nanorods induced by calcium ion" ***ChemPhysChem***, 2012, 13, 3445-3448. (IF: 2.947)

41. R. Velu, N. Won, J. Kwag, K. Im, S. Kim*, **N. Park*** "Metal ion-induced dual fluorescent change for aza-crown ether acridinedione-functionalized gold nanorods and quantum dots" ***New J. Chem***., 2012, 36, 1725-1728. (IF: 3.201)

42. J. B. Lee, A. S. Shai, M. J. Campolongo, **N. Park**, D. Luo* "Three-Dimensional Structure and Thermal Stability Studies of DNA Nanostructures by Energy Transfer Spectroscopy" ***ChemPhysChem***, 2010, 11, 2081-2084. (IF: 2.947)

43. **N. Park**, M. R. Hartman, J. Kahn, E. Rice, H. Funabashi, D. Luo* "High-Yield Cell-free Protein Production from P-gel" ***Nature Protocols***, 2009, 4, 1759–1770. (IF: 12.423)

44. **N. Park**[1], S. Um[1], H. Funabashi, J. Xu, D. Luo* "A Cell-free Protein Producing Gel" ***Nature Materials***, 2009, 8, 432–437. Highlighted in Nature Methods ("Protein

production: no cells required", 2009, 6, 326), introduced in News and Views of Nature Materials ("Hydrogels: Gene jelly", 2009, 8, 370-372), also in RSC Chemistry World ("Gene gels pump out proteins", 2009, May issue) and many others. (IF: 39.235)

45. W. Cheng, **N. Park**, M. T. Walter, M. R. Hartman, D. Luo* "Nanopatterning Selfassembled Nanoparticle Superlattices by Moulding Microdroplets" ***Nature Nanotechnol.,*** 2008, 3, 682–690 (cover article for Nov 2008). (IF: 37.490)
46. S. H. Um, J. B. Lee, **N. Park**, S. Kwon, C. Umbach, D. Luo* "Enzyme-catalyzed Assembly of DNA Hydrogel" ***Nature Materials***, 2006, 5, 797–801. (IF: 39.235)
47. Y. K. Kim, J. Kim, **N. Park**, J. H. Hahn, K. H. Ahn* "Cage-type Molecules with Cavity: Selective Gas Phase Cation Complexation" ***J. Org. Chem***., 2005, 70, 7087– 7092. (IF: 4.805)
48. Y. J. Kim, Y. A. Kim, **N. Park**, J. H. Hahn* "Structural Characterization of the Molten Globule State of Apomyoglobin by Limited Proteolysis and HPLC-Electrospray Ionization Mass Spectrometry", ***Biochemistry***, 2005, 44, 7490–7496. (IF: 2.997)
49. **N. Park**, J. H. Hahn* "Electrochemical Sensing of DNA Hybridization Based on Duplex-Specific Charge Compensation" ***Anal. Chem***., 2004, 76, 900–906. (IF: 6.042)
50. **N. Park**, S. Kim, J. H. Hahn* "Cylindrical Compact Thermal-Cycling Device for Continuous-Flow Polymerase Chain Reaction" ***Anal. Chem***., 2003, 75, 6029–6033. (IF: 6.042)
51. H. Makamba, J. H. Kim, K. Lim, **N. Park**, J. H. Hahn* "Surface Modification of Poly(dimethylsiloxane) Microchannels" ***Electrophoresis*** 2003, 24, 3607–3619. (IF: 2.569)
52. D. H. Kim*, J. Park, S. J. Chung, J. D. Park, **N. Park**, J. H. Hahn "Cleavage of β-Lactone Ring by Serine Protease. Mechanistic Implication" ***Bioorg.& Medicin. Chem***., 2002, 10, 2553-2560. (IF: 2.881)

(Invited speaking/oral presentations)

1. "DNA hydrogel templated gold nanoparticle assembly for synergistic cancer therapy" SDDS 2017. Prague, Czech, July 12-14, 2017.

2. "Light-responsible DNA hydrogel–gold nanoparticle assembly for synergistic cancer therapy" UKC 2016, Dallas, USA, July 10-13, 2016.

1. "DNA hydrogel templated mesoporous gold sponges", ICEAN 2012, Brisbane, Australia, Oct 22-24, 2012.

2. "Engineering DNA as both a genetic and a generic material", Center for Biomedical Science, KIST, May 04. 2010.

3. “Engineering DNA as both a genetic and a generic material”, Graduate School of Nanoscience and Technology, KAIST, Apr. 28. 2010.

4. “DNA as both a genetic and a generic material”, Dept of Chemical and Biomolecular Engineering, Johns Hopkins University, Feb. 04. 2010.

5. “DNA as both a genetic and a generic material”, Dept of Chemistry, POSTECH, Jan. 11. 2010.

6. “DNA as both a genetic and a generic material”, Samsung Advanced Institute of Technology, Jan. 8. 2010.

7. “DNA as both a genetic and a generic material”, Ulsan National Institute of Science and Technology, Jan. 06. 2010.

8. “A Cell-free Protein Producing DNA Hydrogel”, MRS national meetings at Boston, MA - Nov 2006.

9. Presented “DNA based nanobarcodes for DNA detection” instead of Professor Dan Luo who was originally invited for Nanomedicine and Drug Delivery Symposium at Omaha, NE – Oct 2006.

(Book chapter)

1. W. Cheng, L. Ding, H. Funabashi, N. Park, S. Um, J. Xu, and D. Luo “Nucleic acid engineering” in Systems Biology and Synthetic Biology, Ed. Pengcheng Fu and Sven Panke, Wiley, 2009.

Patents

1. “Nucleic acid construct and method of preparing nanoparticle using the same”, USA, registered, US9334301 B2, 2016.

2. “Hydrogen peroxide sensitive metal nanoparticles, method for producing the same and hydrogen peroxide detection system comprising the same”, USA, registered, US9222884 B2, 2015.

3. “Conductive layered structure, electrode and supercapacitor comprising the conductive layered structure, and method for preparing the conductive layered structure”, USA, registered, US9224542 B2, 2015.

4. “Method of preparing porous metal oxide structure”, USA, registered, US9138941 B2, 2015.

5. “High throughput device for performing continuous-flow reactions”, USA, registered, US20110177563 A1, 2011.

6. "Detection method of nucleic acid hybridization", Japan registered 4098715 (20080321).

7. “Detection method of nucleic acid hybridization based on Brewster angle microscopy", Korea registered 10-0681943 (20070206).

8. “Continuous-flow reactor", Korea rigistered 10-0593263 (20060619)

9. "Detection method of nucleic acid hybridization", China registered ZL02818727.X (20060503).

10. “Detection method of nucleic acid hybridization", Germany registered 602 08801.1 (20060202).

11. “Detection method of nucleic acid hybridization", EP, registered 1409741 (20060118).

12. “Detection method of nucleic acid hybridization ", Korea registered 10-0467778 (20050113).