

Exponent®
Engineering & Scientific Consulting

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Professional Profile

Dr. Lu's expertise is in material chemistry, nanoscience and biochemistry. He has over six years of research and practical experience in luminescent materials, optical sensing and imaging, and integration of luminescent materials with functional devices. During his doctoral studies, his research was focused on the synthesis and application of perovskite-polymer composites on microfluidic chips for real-time thermal mapping.

Dr. Lu developed water resistant and thermally stable variants of perovskite nanomaterials for use as optical temperature probes in aqueous environment. His work also involved the design and fabrication of microfluidic chips and optical setup for chemical and biological sensing.

As a researcher and consultant, Dr. Lu routinely utilizes a variety of material characterization techniques, such as fluorescence microscopy, confocal microscopy, scanning electron microscopy (SEM), transmission electron microscopy (TEM), atomic force microscopy (AFM), energy dispersive spectroscopy (EDS), X-ray photoelectron spectroscopy (XPS), and X-ray diffraction techniques (XRD). He is also experienced in synthesis of perovskite nanocrystals by hot-injection and ligand-assisted reprecipitation method, and preparation of perovskite-polymer composite films with an integration of microfluidic chips.

Prior to joining Exponent, Dr. Lu worked as a postdoctoral fellow in Department of Chemistry, Hong Kong University of Science and Technology. There he investigated and developed luminescent nanomaterials with aggregation-induced emission properties used in bioimaging, photothermal therapy and photodynamic therapy.

Academic Credentials & Professional Honors

Ph.D., Chemistry, Hong Kong University of Science and Tech, 2021

M.S., Analytical Chemistry, Hong Kong University of Science and Tech, 2017

First-, Second-, and Third-Class Scholarship, China Pharmaceutical University, 2012-2016

Prior Experience

Postdoctoral fellow, Department of Chemistry, Hong Kong University of Science and Technology, 2021-2022

Professional Affiliations

American Chemical Society

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Publications

Ma, J.; Lu, Z.; Li, C.; Luo, Y.; Shi, Y.-e.; Alam, P.; Lam, J. W. Y.; Wang, Z.; Tang, B. Z., Fluorescence Ratiometric Assay for Discriminating GSH and Cys Based on the Composites of UiO-66-NH2 and Cu Nanoclusters. Biosens. Bioelectron. 2022, 215, 114582.

Wang, D.; Lu, Z.; Qin, X.; Zhang, Z.; Shi, Y.-e.; Lam, J. W. Y.; Wang, Z.; Tang, B. Z., Boric Acid-Activated Room-Temperature Phosphorescence and Thermally Activated Delayed Fluorescence for Efficient Solid-State Photoluminescence Materials. Adv. Opt. Mater. 2022, 10 (18), 2200629.

Guo, J.; Lu, Z.; Li, C.; Miao, Y.; Zhang, B.; Lam, J. W. Y.; Shi, Y.-e.; Wang, Z.; Tang, B. Z., Long-Lived Afterglow from Elemental Sulfur Powder: Synergistic Effects of Impurity and Structure. ACS Omega 2022, 7 (34), 30582-30589.

Lai, H. M.; Lu, Z.; Choi, C. K. K.; Zhou, W.; Ngo Yau, C.; Tang, B. Z.; Ko, H., Direct Room Temperature Synthesis of α-CsPbI3 Perovskite Nanocrystals with High Photoluminescence Quantum Yields: Implications for Lighting and Photovoltaic Applications. ACS Appl. Nano Mater. 2022, 5 (9), 12366-12373.

Lu, Z.; Li, Y.; Xue, Y.; Zhou, W.; Bayer, S.; Williams, I. D.; Rogach, A. L.; Nagl, S., Water-Stable CsPbBr3/Cs4PbBr6 Nanocrystals with a Mixed Fluoropolymer Shell for Optical Temperature Sensing. ACS Appl. Nano Mater. 2022, 5 (4), 5025-5034.

Lu, Z.; Li, Y.; Qiu, W.; Rogach, A. L.; Nagl, S., Composite Films of CsPbBr3 Perovskite Nanocrystals in a Hydrophobic Fluoropolymer for Temperature Imaging in Digital Microfluidics. ACS Appl. Mater. Interfaces 2020, 12 (17), 19805-19812.

Geng, T.; Banerjee, P.; Lu, Z.; Zoghbi, A.; Li, T.; Wang, B., Comparative Study on Stabilizing Ability of Food Protein, Non-ionic Surfactant and Anionic Surfactant on BCS Type II Drug Carvedilol Loaded Nanosuspension: Physicochemical and Pharmacokinetic Investigation. Eur. J. Pharm. Sci. 2017, 109, 200-208.

Presentations

Lu, Z., Xue, Y. and Nagl, S., “Photothermal Detection in Microreactors Using a Luminescent Temperature Sensing Layer”, The 27th Symposium on Chemistry Postgraduate Research, Hong Kong, China, 2020.

Lu, Z., Xue, Y., Qiu W., Rogach, A. L. and Nagl, S., “Perovskite Nanocrystals – Hyflon AD 60 Optical Thermal Sensors for Temperature Imaging in Digital Microfluidics”, The 23rd International Conference on Miniaturized Systems for Chemistry and Life Sciences (μTAS), Basel, Switzerland, 2019.

Lu, Z., Xiong Y., Li Y., Rogach, A. L. and Nagl, S., “Microreactor Platforms Integrated with Novel Luminescent Temperature Sensor Materials for Microscale Continuous Flow Chemical Synthesis”, The 22nd International Conference on Miniaturized Systems for Chemistry and Life Sciences (μTAS), Kaohsiung, Taiwan, 2018.