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Nanoscale Horizons Emerging Investigator Series: Dr Jiang Zhou, Central South University, Hunan, China

Our Emerging Investigator Series features exceptional work by early-career nanoscience and nanotechnology researchers. Read Jiang Zhou's Emerging Investigator Series article 'An ionically cross-linked composite hydrogel electrolyte based on natural biomacromolecules for sustainable zinc-ion batteries' (https://doi.org/10.1039/D4NH00243A) and read more about him in the interview below.

Prof. Jiang Zhou received his bachelor's degree (2011) and PhD (2015) from Central South University (CSU). During 2014–2015, he studied in Prof. Hua Zhang's group at Nanyang Technological University (NTU) as an exchange PhD student. After graduation, he carried out his Postdoctoral Research in Prof. Ju Li's group at the Massachusetts Institute of Technology (MIT) from 2016. He joined CSU as a Professor at the end of 2017. His research interests include aqueous zinc-ion batteries, lithium (sodium)-ion batteries, *etc.* He has published over 200 papers in international journals, which have attracted more than 30 000 citations with an *h*-index of 91. He is an elected fellow of the Royal Society of Chemistry (RSC) and has been ranked as a Clarivate Web of Science "Highly Cited Researcher" since 2021. He has been an Associate Editor of *Nano-Micro Letters*, and sat on the Editorial Advisory Board of *ChemSocRev* and the Editorial Boards of *National Science Review*, *eScience*, *InfoMat*, *etc.*

Read Jiang's Emerging Investigator Series article 'An ionically cross-linked composite hydrogel electrolyte based on natural biomacromolecules for sustainable zinc-ion batteries' (https://doi.org/10.1039/D4NH00243A) and read more about him in the interview below:

NH: Your recent Nanoscale Horizons Communication describes an ionically cross-linked composite hydrogel electrolyte based on natural biomacromolecules for sustainable zinc-ion batteries. How has your research evolved from your first article to this most recent article and where do you see your research going in future?

JZ: My early research focused on studying vanadium oxides as cathode materials for lithium batteries; however, due to their low operating voltage and the absence of lithium ions in these materials, they have limited possibility in practical applications. This led me to shift my focus towards using these materials as cathodes in aqueous zinc batteries. Aqueous zinc batteries offer excellent prospects for large-scale energy storage and flexible energy solutions due to their inherent advantages of high safety and low cost. However, this system still faces several challenges. Over the past seven years, we have been focusing on the research and development of cathodes, zinc anodes, electrolytes, and energy storage devices related to aqueous zinc batteries, and we have made significant progress in this field. In the future, we aim to enhance the calendar life, cycle life, and energy density of aqueous zinc batteries to realize their practical applications.

NH: How do you feel about Nanoscale Horizons as a place to publish research on this topic?

JZ: Overall, I believe that *Nanoscale Horizons* is an excellent platform for communicating cutting-edge research and fostering collaboration among researchers, making it an outstanding choice for sharing our findings on aqueous zinc batteries. Additionally, the efficient review and publication process ensures that our contributions reach the scientific community promptly, which is crucial in this rapidly evolving field. Given the growing interest in sustainable energy solutions, *Nanoscale Horizons* will continually attract a significant readership eager to explore advancements in this area.

NH: What aspect of your work are you most excited about at the moment?

JZ: I'm particularly excited about the intersection of biomedical engineering

and our work on flexible zinc batteries, especially regarding their application in medical devices for healthcare. The potential to enhance healthcare technology with these innovative energy solutions is incredibly motivating. Aqueous zinc batteries used for large-scale energy storage face strict cycle life requirements, typically greater than 15 years and 5000 cycles, a target that current aqueous zinc batteries still struggle to meet. However, due to their high biocompatibility and safety features, these batteries are expected to find applications in the near future in medical devices.

NH: In your opinion, what are the most important questions to be asked/answered in this field of research?

JZ: In my opinion, the most important questions in the field of aqueous zinc batteries include how to address the stability of electrode materials in aqueous electrolytes to achieve superior comprehensive electrochemical performance. Additionally, it is crucial to explore the feasibility of all-solid-state electrolytes within the zinc battery system.

NH: What do you find most challenging about your research?

JZ: I find that one of the most challenging aspects of my research is the need for innovative ideas and sufficient funding support. My current work spans multiple disciplines, including materials preparation techniques, electrochemistry, bioelectronics, and biomedical engineering, making it challenging to recruit suitable students and postdoctoral researchers with the right expertise. Additionally, securing stable project funding has become increasingly difficult.

NH: In which upcoming conferences or events may our readers meet you?

JZ: I have attended eight academic conferences both domestically and internationally this year (2024). So, I do not plan to attend more events for the remainder of the year. Typically, I attend the National Electrochemical Congress, the Chinese Materials Conference, and the Chinese Chemical Society Congress. Next year (2025), I hope to participate in the battery conference organized by the Royal Society of Chemistry (RSC).

NH: How do you spend your spare time?

JZ: Research can sometimes be quite stressful, so in my spare time, I enjoy listening to music, watching movies, and having conversations with my friends. During holidays, I like to travel, especially to beautiful scenic locations.

NH: Can you share one piece of career-related advice or wisdom with other early career scientists?

JZ: Working hard is very important, but it's equally important to engage in critical thinking. As Thomas Edison said, 'Genius is one percent inspiration and ninety-nine percent perspiration', yet that one percent of inspiration can sometimes be even more vital than the ninety-nine percent of hard work. I have found this insight to be particularly significant in my own career.