PRESS RELEASE
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Anna Sundström Award 2024 to Hao Yang

Hao Yang, postdoctoral researcher at the Department of Chemistry at the Royal Institute of Technology (KTH), is this year's recipient of the Anna Sundström Award. He receives the award for his dissertation, *(Photo)electrochemical Water Oxidation: From Catalysis to Functional Device*.

The focus of Hao Yangs dissertation is artificial photosynthesis.

Hao Yang (left) with his supervisor Licheng Sun. Photo: Hao Yang

— My research focuses on developing polymeric catalysts and organic-inorganic hybrid light-harvesting materials for water oxidation. These materials are key components in the process of splitting water into oxygen and hydrogen using solar energy, which is essential for producing clean hydrogen as a sustainable energy carrier.

What is your background and how did you choose to go into this line of research?

— I have a background in applied chemistry, with a focus on photovoltaics during my bachelor's studies and molecular catalysis at the master's level. This foundation sparked my passion for exploring renewable energy technologies. My interest in sustainable photoelectrochemical catalysts developed during my university studies in China and Australia, where I recognized the potential of solar energy in addressing global energy challenges. Water splitting, particularly water oxidation, is a crucial step in hydrogen production, and I saw an opportunity to contribute to this rapidly growing field. The challenge of designing efficient catalysts and light absorbers for this reaction is what drew me into this research area.

What are your hopes for this research in the future?

— I believe that polymeric materials with well-defined structures offer stability, chemical versatility, and flexibility in metal site incorporation, making them ideal catalytic platforms for lab research and industrial applications. I anticipate that steering molecularly defined water oxidation catalysts in this direction could bridge the insights from molecular catalysis to practical heterogeneous electrocatalytic devices. Additionally, I am confident that further exploration of photovoltaic material-based photoelectrodes, particularly organic-inorganic hybrid perovskites, offers significant promise for sustainable, large-scale solar fuel production.

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— In the future, I hope my work will contribute to more efficient and scalable methods for producing not only oxygen and hydrogen but also valuable fuels like ammonia and hydrocarbons.

Do you have any chemist that you look up to?
— I greatly admire Allen Joseph Bard for his pioneering work in electrochemistry, which has significantly advanced our understanding of fundamental electrochemical reactions at the molecular level. He has authored and co-authored a series of influential scientific books, with *Electrochemical Methods: Fundamentals and Applications* being the most widely used textbook globally, essential for every electrochemistry student. His dedication to research, education, and scientific literature continues to inspire me.

Would you recommend others to study chemistry?
— Yes! Chemistry is fundamental to many scientific breakthroughs, from energy and materials science to biological research, offering diverse career opportunities. It's a field grounded in experimentation, where curiosity and passion drive discovery. For those who want to make a meaningful impact, whether by advancing renewable energy solutions or developing innovative materials that improve everyday life, chemistry is an excellent choice.

What does it mean for you to receive the Anna Sundström Award?
— Receiving this prestigious award is a great honor for me. It recognizes the hard work and dedication I've put into my research. This award motivates me to continue working toward further breakthroughs in inorganic chemistry.

Prize motivation

"The work involved advanced synthesis of materials, very thorough characterization of surfaces, and theoretical calculations. He (Hao Yang) successfully synthesized a molecularly well-defined catalyst, featuring π-conjugated microporous polymer coordinated single cobalt sites, which opens the possibility for exploring the mechanisms of heterogeneous water oxidation. His thesis offers profound insights into host-guest chemistry, cobalt-mediated catalytic processes, and the development of efficient light-absorbing materials using organic-inorganic hybrid perovskites. The findings presented in his thesis could offer a general approach to heterogeneous water oxidation catalysis and related proton-coupled electron transfer reactions.Important mechanisms in catalytic water oxidation have been elucidated. Both volume, complexity of work and contribution from PhD student himself were very impressive."

The Anna Sundström Award

The Anna Sundström Award is presented annually by the Division of Inorganic Chemistry of the Swedish Chemical Society to honor Anna Sundström, who worked with Swedish chemist Jacob Berzelius and is often regarded as Sweden's first female chemist.
Read more about the Anna Sundström Award here.

For questions, please contact:
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