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Yun Hang Hu

Michigan Technological University, yunhangh@mtu.edu

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EDITORIAL**Energy Science & Engineering: Looking ahead**

Professor Yun Hang Hu, Editor-in-Chief

It is my pleasure to have the honor of succeeding Tomas Kaberger as Editor-in-Chief of Energy Science & Engineering. Under Tomas's guidance, the effort of editorial board members and journal staff, and the contribution of all authors, ESE has become a leading open access energy journal in the world. It received an Impact Factor of 3.553 in the 2018 release of the Journal Citations Reports[®] from Thomson Reuters.

Providing sufficient energy to meet the requirements of a growing population with rising living standards is a critical challenge of the 21st century. Our current major source of energy comes from fossil fuels, including oil, coal, and natural gas, which are associated with two issues: the insufficient source for use and the climate change caused by CO₂ emission. Technological innovation is expected to play a critical role in facilitating the transition to low-carbon and renewable energies.

Several technologies have been developed for sequestration of CO₂, such as oceanic injection, geological injection, and scrubbing and mineral carbonation. However, their intrinsic issues would limit their applications. For example, although injection of a pure CO₂ stream deep in the ocean is widely considered by engineers, CO₂ injection may have some negative effects on deep sea biota. Industrial CO₂ can also be injected into deep geological strata. The cost and leakage are its principal issues. For those reasons, the utilization

of CO₂ is being considered as a more attractive solution to solve CO₂ issues.

Solar cells provide an efficient technology to convert solar energy into electricity. However, the cost of electricity produced from commercial silicon photovoltaics is several times higher than that produced from fossil fuels, generating a prohibition for widespread adaptation of solar energy. Therefore, low-cost solar cells are necessary, but the efficiency of lower cost solar cells (such as ones based on polymers or quantum dots) started low, and climbed slowly to reach about 10%. In contrast, perovskite solar cells (PSC) have quickly achieved a high efficiency over 20% in 5 years. It is a high expectation that PSCs will be commercialized in near future. Hydrogen is being considered as a promising clean fuel for future transportation, which requires innovative technologies to produce, store, and utilize hydrogen. It is ideal to use solar energy for hydrogen production from water, which requires a breakthrough for the photocatalytic process with over 10% energy conversion efficiency. Developing efficient on-board hydrogen storage technology with high reversible capacity at low cost is still a challenge for hydrogen vehicles. Fuel cells are important devices for hydrogen utilizations. However, more efficient electrode materials are necessary to increase their efficiencies and reduce their cost. Batteries, such as ion rechargeable batteries, are the most important type of energy storage technologies widely used in portable electrical devices and electrical vehicles. However, their long recharging time and small capacity need to be improved. Other types of renewable energies are also attracting attentions. For example, wind energy has been experiencing dramatic cost reduction, but it still suffers some issues (such as low-energy density and intermittency).

Technical Innovations to solve the energy issues require global collaborations between scientists and engineers. ESE aims to facilitate the collaborations and spark innovations in energy research and development by publishing high-quality research papers, which are accessible to a broad readership. With my experience of the journal as an editorial board member, a reader, an author, and a reviewer, I am delighted to now be assuming the role of Editor-in-Chief. My vision for ESE is not only to retain the leading position among open access energy journals but also to become a very high impact journal.

We will take steps to reduce the time from manuscript submission to acceptance, to increase further the impact factor of the journal, and to produce special issues for increasing exposure of articles on common themes.

I would like to again acknowledge Tomas Kaberger, editorial board members, and journal staff, for their diligent work over 5 years to make ESE the important journal. I also appreciate the support from Wiley and SCI (Society of

Chemical Industry). Without doubt, the future of ESE is really in your hands as our readers, authors, and reviewers. We look forward to receiving and publishing your high-quality manuscripts.

Yun Hang Hu
Editor-in-Chief