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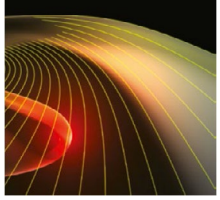

EDITORIAL

Energy and sustainability: A historical moment for the nation and the world

Last month, we were elated to learn that the climate and energy provisions of the Inflation Reduction Act will speed greenhouse gas mitigation and put the US on track to deliver the intended target for 2035. The bill includes $369 billion in climate and energy provisions that will transform how the nation gets its energy and shape the country's climate and industrial policy for decades. It is indeed a historical moment.

MRS Energy & Sustainability was launched as a reviews-only journal in 2014. The Materials Research Society (MRS) has a long track record of recognizing the scientific, technological, and sociological complexity relating to energy, the environment, and sustainability. The birth of the journal 8 years ago was motivated by the Society's vision as a global organization of materials researchers that promotes communication for the advancement of interdisciplinary materials research and technology to improve the quality of life. Naturally, energy and sustainability are at the core of our quality of life.

Since I became the Editor-in-Chief of the journal in 2018, my goal has been to broaden its scope by introducing more original research and focused topics to the journal's coverage. (Original research represents 39% of published content since 2020). Despite the lack of in-person meetings in 2020 and 2021 due to the pandemic, I am delighted to see the enthusiastic engagement from the materials science community at large. Remarkably, we have increased numbers of downloads all over the world and submissions are steadily increasing. The journal has subscriptions on all six habitable continents, and the variety of content has made it a destination for the most cutting-edge research in the field. In 2021, MRS entered a new publishing alliance with Springer-Nature, one of the world's powerhouses for scientific publications.

At this critical moment of energy transition in the world, *MRS Energy & Sustainability* will continue to serve the MRS community and society at large by publishing the convergent research among science, technology, economics, and policy. The journal published some of its most highly cited papers addressing recycling, critical materials supply chain, life cycle analysis for renewables, materials circularity, etc., long before those issues caught the public's attention.

Our readers include a broad spectrum of scientists, academics, policy makers, and industry professionals, all interested in the interdisciplinary nature of the science, technology, and policy aspects of energy and sustainability. Looking ahead when energy and sustainability will inevitably be the focus of our modern society, we can anticipate even more high-quality research and cutting-edge topics being presented at MRS meetings. As MRS plans to celebrate its 50th anniversary in 2023, we should uphold this flagship journal as the communication platform where we can share our knowledge to advance materials science for energy and sustainability.

I am delighted to introduce our latest topical collection on large-scale energy storage, guest edited by Dr. Jenny Baker from Swansea University in the UK, Prof. Dan Steingart from Columbia University in the US, and Prof. Yongyao Xia from Fudan University in China. Large-scale energy storage has both an economic role and a security role (as clearly evidenced in Europe right now). This special collection covers a number of technologies that can support energy security alongside the integration of renewables. For instance, countries need to adopt policy and pricing mechanisms to incentivize the infrastructure that they need for a low carbon secure energy supply as discussed by J. William McNamara et al. as the scale of energy storage required to enable the energy transition is enormous. If we assume a perfectly efficient energy storage system based on iron–air, we would need to reserve 150% of the global production of steel for one year just to meet one season of demand in the United States. However, when we contextualize this with the amount of coal required historically, the metal extraction requirements of the transition are but a one-time tax. Guest editor Dan Steingart spent his sabbatical time with the steel industry and could see that the recognition of such a challenge is certainly awakening. We, as a community and a society, have the privilege and responsibility to do this correctly. It is crucial that materials scientists work with policy makers and industrialists alike to ensure the batteries that stabilize the grid are produced ethically and in a manner that minimizes immediate damage to the earth. When we solve this challenge, and we *will* solve it, the earth can then be in the process of rebalancing its carbon cycle.

We thank you, the authors and readers of *MRS Energy & Sustainability,* for making this journal more impactful each year–we certainly have more work to do as the US and the entire world move forward with energy transition to improve our quality of life!

Thank you for being our partners.

Y. Shirley Meng
Editor-in-Chief