ACS Sustainable Resource Management

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Editorial

The ACS Sustainable Family—Complementary yet Distinct: Some Evolving Thoughts from the Editors' Desks

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Sustainability has rapidly become a defining criterion for decision-making across science, industry, and government. It now shapes how policymakers, businesses, and consumers evaluate the viability of products, processes, and technologies. This is done not only to improve their performance but also to ensure sustained economic and environmental vitality. In 2013, the American Chemical Society (ACS) launched the journal *ACS Sustainable Chemistry & Engineering* (*ACS-SCE*) to convene and celebrate advances and discoveries in chemical processes and technologies that demonstrate the principles of green chemistry and green engineering. Thanks to the global research community, *ACS-SCE* has experienced rapid growth in stature and is now among the leading journals in the discipline, based on the increasing number of submissions from authors worldwide. During the past decade, the topics of waste recycling and circularity have become increasingly important in the context of sustainability. To provide more bandwidth for publishing work in these rapidly emerging areas, *ACS Sustainable Resource Management* (*ACS-SRM*) was launched in 2024. Together, these journals form a cohesive journal family that reflects ACS's commitment to sustainability from cutting-edge scientific, technological, and systems-based perspectives.

While both titles continue to rapidly grow in submissions, we are often challenged, as editors, to articulate how the two journals differ in scope and to clarify what attributes set these two journals apart. This editorial seeks to offer a clear comparison between *ACS-SCE* and *ACS-SRM*, helping authors determine the best venue for their work while underscoring the shared vision that unites both journals.

ACS-SCE continues to focus on the design of novel processes, technologies, and materials that minimize negative environmental impacts and maximize the efficiency of these activities. The key principles under consideration are (i) green chemistry and engineering that reduce hazardous compounds in chemical processes, (ii) circularity that produces products that can be reused, recycled or degraded by organisms, and (iii) efficiency of energy utilization and storage by focusing on advanced materials and low-energy manufacturing processes. A key motivation of *ACS-SCE* is thus to minimize the generation of toxic waste during chemical production, develop environmentally friendlier materials that produce less waste, and enhance industrial processes to reduce their ecological footprint. Examples of *ACS-SCE* principles include (i) life cycle assessment (LCA), which examines the environmental impact of extraction of raw materials, their use, and finally their disposal, (ii) the application of appropriate mass and/or intensity based metrics the at drive waste minimization thereby quantitatively leading to more effective and productive processes, (iii) the use of renewable feedstock instead of crude oil or coals, and (iv) intensification of chemical processes that minimize energy use or waste generation. Several editorials on these topics and others provide guidelines to authors on manuscript attributes that have the best chance of being published in *ACS-SCE*. Some of these editorials can be found in the repository of editorials as indicated in ref 1.

In contrast, ***ACS-SRM*** welcomes manuscripts that present novel approaches in managing natural resources (air, water, soil, minerals, and forests) and "wastes" (from food, textiles, agriculture, batteries, mining, energy-related elements, etc.) that preserve the environment and guarantee the long-term availability of these resources for sustaining human and ecological activities. *ACS-SRM* is dedicated to (i) resource efficiency by reducing wastes during resource extraction and consumption, (ii) protecting the environment through a controlled management of effluent discharge to air, water, and soil by utilizing technologies that minimize discharges, and (iii) developing strategic policy and governance guidelines that facilitate the proper implementation of regulations to ensure the sustainable use of our resources. The goal of *ACS-SRM* is to ensure the fulfillment of the United Nations Sustainable Development Goals (UNSDGs) in complementary ways to those addressed by *ACS-SCE*.[2−4] Examples of *ACS-SRM* content include (i) material flow analysis (MFA) of natural and waste resources as exemplified in a recent paper that describes the MFA of pesticides generated from the use of chemical fertilizers in Sri Lanka,[5] (ii) the conversion of biomass residues/wastes and industrial waste streams into functional materials that promote circular resource flows while mitigating carbon emissions, (iii) management of critical planetary resources such as air, water, and soil through remediation and pollution control using natural or waste streams of "biological" carbon, and (iv) promoting the recycling and reuse of consumer products such as building materials, textiles, and food, energy generation systems such as

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batteries, and mining wastes from the extraction of rare earth metals and critical minerals.

In summary, it should be recognized that both *ACS-SCE* and *ACS-SRM* showcase topics that are central to the achievement of the UNSDGs. *ACS-SCE* seeks to focus on the development of new principles and practices that spearhead the enhancement of sustainability. An *ACS-SRM* paper could use established techniques to address a new question or challenge associated with a resource or, indeed, the valorization of a waste. *ACS-SCE*, on the other hand, aims to showcase new techniques and insight at a fundamental level, which could result from the application of a resource-based question; however, clear novelty in the underpinning science and/or technology must be evident.

To further support this distinction, the ACS Sustainable Family of journals continues to promote the use of sustainability metrics, quantifiable indicators used to assess the environmental and economic impacts of technologies. In addition, *ACS-SRM* aims to promote the concept and development of metrics that meaningfully assess SUStainable MAnagement (SUSMA) of natural resources to better demonstrate benefits and challenges of processes reported in its pages. SUSMA metrics should be quantifiable parameters to ensure that management of waste does not lead to the generation of additional or unmanageable waste. For example, removal of contaminants from water, while essential for broader sustainability, should not lead to the generation of new or secondary wastes or toxicity that could be more problematic for the environment and become unmanageable.

As an editorial team, we recognize that current forms of sustainability metrics often fail to comprehensively evaluate the downstream impacts of a product, or "new waste", which may be associated with a technological intervention or treatment. *ACS-SRM* will focus its attention on the development and celebration of management technologies that demonstrate benefits and challenges that can be identified with the aid of suitable SUSMA metrics.

The SUSMA metrics are structured to evaluate key dimensions of sustainability, including but not limited to resource efficiency, circularity, environmental impact, societal and ethical impact, and management and resilience. Each technology or solution will be assessed using individual and composite scores, differentiating its suitability for a sustainable planet. To facilitate analysis, we envision an initial framework depicted in Figure 1. We understand that further dialogue and refinement are necessary to synthesize a universally acceptable framework for SUSMA metrics, and we aim to encourage such discourse in ACS-SRM.

Figure 1. Important components of proposed SUSMA metrics, with each metric being evaluated individually and weighted suitably to arrive at a cumulative score that may be used to quantify technologies for their appropriateness.

We hope that this editorial clarifies the key differences and complementarities of the two journals within the ACS Sustainable Family. We invite the research community to take advantage of these unique forums to submit their manuscripts. When warranted, the editors of these two journals will encourage authors to consider transfer offers within the ACS portfolio to ensure that their manuscript is being processed by the journal that best aligns with the scope of their work. The transfer process will be seamless and obviates the need to resubmit manuscripts. We truly appreciate the support of the global research community and welcome queries and feedback as always to serve you better.

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Notes

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