

Expectations for Manuscripts with Nanoscience and Nanotechnology Elements in *ACS Sustainable Chemistry & Engineering*

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Article Recommendations

ACS Sustainable Chemistry & Engineering (ACS SCE) publishes work at the frontiers of research in green chemistry, green engineering, and science and technology that make contributions to enhancing sustainability. In editorials this year,^{1–4} we have outlined the journal's scope in specific areas, although we recognize that each of these areas is dynamic and broadened continuously. The communities that are served by our journal are expansive, encompassing research in catalysis, energy, water, sensors, healthcare, agriculture, environment, and other areas. While the topical areas covered by the journal are many, materials are ubiquitous, and development of materials with novel properties and reactivity is central to many subject areas of relevance to ACS SCE. Of particular significance in the context of this editorial is that properties of materials, especially when considered on the nanoscale, can be tailored to enhance sustainability.

Nanoscience and nanotechnology refer to the science and technology of materials at the nanometer (nm) length scale, with characteristic dimensions in the range of 1–100 nm. Materials at this length scale have unusual properties that make them interact with stimuli differently than their bulk counterparts. Optical, electrical, magnetic, chemical, and other characteristics of nanomaterials can be used to enhance sustainability in chemical and engineering processes. For example, specific photons absorbed by nanoscale materials can cause the splitting of water, producing hydrogen and oxygen. Similar processes leading to excitation of energy states in nanoscale materials can result in electrical power using sunlight. Nanomaterials can be structured to generate electricity by mechanical stimulation, allowing self-powered wearable devices. Atomic-level science and engineering can be deployed to create exquisitely structured nanomaterials that can quantify contaminants in air and with zeptomole sensitivity. All of these properties may be changed by size, shape, composition, functionality, and organization of the constituent materials, providing a plethora of opportunities for new research, reflected in the diversity of manuscripts published in ACS SCE.

Approximately a third of the manuscripts that ACS SCE has published since its launch have used nanomaterials. These have included metal and metal oxide nanoparticles, two-dimensional (2D) materials, carbon nanomaterials, nanofibers, nanotubes, nanorods, nanodots, nanowires, quantum dots, nanocellulose, vesicles, nanoclusters, nanocomposites, and others. The spectrum of subject areas covered is also diverse. They include

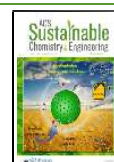
CO₂ reduction, H₂ evolution and storage, chemical transformations, catalysis, pollution prevention, green synthesis, solar energy conversion, electromagnetic interference (EMI) shielding, sensors, batteries and energy storage, antimicrobial agents, separation science, green extraction of metals, resource recovery, sustainable processes in industry as in leather, triboelectricity, and more.

ACS SCE encourages and will continue to publish manuscripts describing nanoscience and nanotechnology that contribute to the broad domains of sustainability. We encourage the use of metrics⁵ in describing how contributions advance sustainability, and the fabrication and use of the materials should not contribute to degradation of the environment or the depletion of its resources. We recognize that nanoscience and nanotechnology are rapidly evolving and that many of the evaluation frameworks and sustainability metrics currently applied in other topical areas may need to be adapted for use in the fields of nanoscience and nanotechnology, but regardless of whether the use of metrics is possible, we strongly encourage authors to explicitly link their research to advancing sustainability.⁵

Research in nanoscience and nanotechnology is equipment and instrument intensive. Without adequate characterization, the materials developed and concomitant properties cannot be understood in detail. However, submissions should not consist of *only* characterization. Submissions should not simply be a compilation of data from a large body of sophisticated tools, access to which alone should not be a criterion for publication. Rather, a clear scientific advancement and an attempt to evaluate its impact to sustainability are critical in our evaluation for publication. If the work is on a new property or application of a known material, a detailed discussion of the characterization of the material, however sophisticated the analysis may be, need not be the main focus or even in the main body of the manuscript. Supporting Information may be used to present these data. This is not to diminish the importance of state-of-the-art characterization data, which are an essential component of research in this area. Rather, our

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intent is to focus on the contributions of well-characterized nanomaterials to advance sustainability.


ACS SCE welcomes submissions describing the green synthesis of established nanomaterials, as well as the synthesis of new nanomaterials. The synthesis of nanomaterials should use sustainable raw materials, greener processes, renewable energy, appropriate solvents, and other features with reduced impact on the planet and its resources.

We also welcome submissions describing the use of nanoscience and nanotechnology in catalysis, natural products conversion, energy storage, exploring alternate materials without toxic elements, and other applications. The link to sustainability should be made clear, and comparisons, preferably using sustainability metrics, should be made to benchmark existing technologies.


Perspectives (review articles) that report significant advances and opportunities in emerging or rapidly evolving topics in nanoscience and nanotechnology related to sustainability are also welcomed. Rather than merely reporting research advances, such manuscripts must clearly discuss potential sustainability advantages of the reviewed topic as well as the fundamental and practical challenges that must be addressed for timely implementation.


We discourage articles in the following categories: (a) synthesis of well-known nanomaterials such as Ag nanoparticles or carbon quantum dots, where the only novelty is the use of a new type of biological material, (b) use of nanomaterials in pollutant treatment systems, (c) establishing catalytic activity of newly synthesized materials using pathways that are not linked to advances in sustainability, (d) optimizing synthetic methods through simulations with limited applicability of the results, (e) presenting the synthesis of advanced materials with limited data, and (f) development of sensors from new materials where similar sensor types have been previously demonstrated, and no further advance in sustainability is demonstrated. These specific examples are only illustrative and not exhaustive; however, authors should not regard these examples as overly broad. For example, novel methods using plant materials to create well-defined nanomaterial shapes or understanding shape evolution may lead to advancement of knowledge and could be considered.

Future editorials will address the evolving scope and expectations for manuscripts in other topical areas covered by ACS SCE. Our intention is that the topically specific discussions of scope will help ACS Sustainable Chemistry & Engineering authors and reviewers understand the types of research contributions that are most likely to be sent for external review and accepted in the journal.

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Notes

Views expressed in this editorial are those of the authors and not necessarily the views of the ACS.

■ REFERENCES

- (1) Allen, D. T.; Carrier, D. J.; Chen, J.; Gathergood, N.; Gong, J.; Han, H.; Hii, K. K.; Hwang, B.-J.; Licence, P.; Meier, M.; Moores, A.; Nakamura, R.; Pradeep, T.; Sels, B.; Subramaniam, B.; Tam, M. K. C.; Zhang, L.; Zhuang, L.; Williams, R.; Anastas, P. T. The Evolution of ACS Sustainable Chemistry & Engineering. *ACS Sustainable Chem. Eng.* **2020**, *8*, 1.
- (2) Tam, M. K. C.; Meier, M. A. R.; Zhang, L.; Allen, D. T.; Licence, P.; Subramaniam, B. Expectations for Papers on Sustainable Materials in ACS Sustainable Chemistry & Engineering. *ACS Sustainable Chem. Eng.* **2020**, *8*, 1703–1704.
- (3) Han, H.; Gong, J.; Hwang, B.-J.; Nakamura, R.; Zhuang, L.; Allen, D. T.; Licence, P.; Subramaniam, B. Expectations for Papers on Photochemistry, Photoelectrochemistry, and Electrochemistry for Energy Conversion and Storage in ACS Sustainable Chemistry & Engineering. *ACS Sustainable Chem. Eng.* **2020**, *8*, 3038.
- (4) Hii, K. K.; Moores, A.; Pradeep, T.; Sels, B.; Allen, D. T.; Licence, P.; Subramaniam, B. Expectations for Manuscripts on Catalysis in ACS Sustainable Chemistry & Engineering. *ACS Sustainable Chem. Eng.* **2020**, *8*, 4995.
- (5) Allen, D. T.; Carrier, D. J.; Gong, J.; Hwang, B.-J.; Licence, P.; Moores, A.; Pradeep, T.; Sels, B.; Subramaniam, B.; Tam, M. K. C.; Zhang, L.; Williams, R. M. Advancing the Use of Sustainability Metrics in ACS. *ACS Sustainable Chem. Eng.* **2018**, *6*, 1–1.