

Advances in Materials

This special topical issue is dedicated to materials processing and development. While a myriad of studies of new materials are reported daily in leading scientific magazines, few of these materials will survive the “death valley” of scale-up to markets. This development challenge is not just restricted to commodities but also to specialty materials for renewable energy, such as batteries whose cost can be a significant fraction of the cost of the electric cars, or of high value biomaterials that must gain approval for medical use. For example, a therapeutic material requires the *reproducible* synthesis of hundreds of kilograms to carry out all clinical tests for approval by federal authorities before even getting to large-scale manufacturing! In addition to functionality, materials should be human-friendly in their use *and* processing. Today, the public is far more leary with scientific discoveries than in the past. Thus, development of sophisticated materials that can rapidly traverse the aforementioned valley requires the practice of modern chemical engineering involving a blend of theoretical understanding and clever experimentation.

At *AIChE Journal*, we strive to attract such contributions in order to stimulate a meaningful scientific exchange on the fundamental thermodynamics, transport phenomena and reaction engineering pertaining to materials processing and development while, at the same time, appealing to the broader community of chemical engineering for cross-fertilization of ideas and innovation. This *Advances in Materials* issue contains invited, peer-reviewed, and timely contributions on an array of materials and their processing techniques by leading laboratories in the United States [Illinois (2), Texas Austin & A&M, MIT, Tufts, Minneapolis, GeorgiaTech, Stanford, Buffalo and Arizona], China (5), Korea (3), Japan, Australia, Italy, Spain, United Kingdom, Germany, France, and Switzerland. The breadth and depth of the topics reflects the diversity and impact of modern chemical engineering in materials processing and development.



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