

Special Issue on  
**Thermodynamics and Thermal Transport Properties in  
Nanomaterials**

# CALL FOR PAPERS

The world's demand for energy is causing a dramatic escalation of social and political unrest. With the development of modern civilizations, the expense of energy has increased progressively and the energy crisis has become a global issue. It goes without saying that sustainable energy is one of the pressing problems facing modern society with materials at the heart of its solutions. Be it high-temperature materials for efficient combustion, nanostructures for high-power density batteries, or metastructures for light harvesting, breakthroughs in energy conversion and efficiency have relied on breakthroughs in materials research.

Due to their promising properties, nanomaterials have been widely used in sustainable energy, catalysis, and medical and engineering related fields and rapid progress has been made during the past decade. However, the use of nanomaterials has also led to the emergence of new problems, such as mechanical and thermodynamic instabilities and heat dissipations in nanodevices.

From the atomistic point of view, size reduction will yield different bonding environments due to a larger surface-to-volume ratio. Consequently, atom vibrations will largely differ from the ones in the bulk state, which directly impacts mechanical, thermodynamic, and thermal transport properties. The changes of the aforementioned properties can be beneficial to the design of new materials in some cases, while it can degrade performances in others. For example, the reduced thermal conductivity in nanomaterials has been favorable to thermoelectric efficiency. Meanwhile, the reduced thermal conductivity is harmful for electronic chips cooling, where heat should be spread as efficiently as possible.

To maximize the merit of nanomaterials, a deeper understanding of their behaviors in various environments is required. For this aim, we are calling for papers addressing nanomaterials efficiency along thermodynamics and thermal transport.

Potential topics include but are not limited to the following:

- ▶ Materials engineering involving nanosized elements
- ▶ Fluids in interaction with nanocomposites
- ▶ Functional inorganic materials and devices
- ▶ Molecular electronic devices
- ▶ Surfaces, interfaces, and corresponding applications
- ▶ Thermodynamics and thermal transport

Authors can submit their manuscripts through the Manuscript Tracking System at <https://mts.hindawi.com/submit/journals/jnm/msct/>.

Papers are published upon acceptance, regardless of the Special Issue publication date.

**Lead Guest Editor**

Shiyun Xiong, Soochow University,  
Jiangsu, China  
*xiongshiyun216@163.com*

**Guest Editors**

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*yuxiang.ni@swjtu.edu.cn*

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*bouyang@illinois.edu*

Shenghong Ju, University of Tokyo,  
Tokyo, Japan  
*shenghong@photon.t.u-tokyo.ac.jp*

Sebastian Volz, Laboratoire  
d'Energétique Moléculaire et  
Macroscopique, Châtenay-Malabry,  
France  
*volz@iis.u-tokyo.ac.jp*

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