

Nanofluid Today

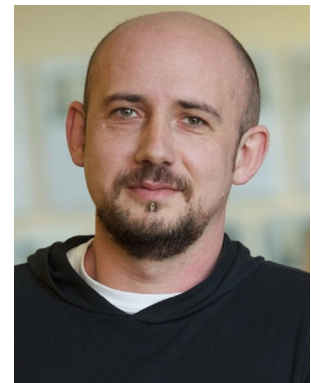
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This compilation is based on the peer-reviewed and selected papers on Nanofluid Today

Preface

Omid Mahian¹ · Ehsan Ebrahimi-Bajestan^{2,3} · Sébastien Poncet⁴

Recently, the unique characteristics of nanofluids have stimulated a number of researchers to study the performance of these materials in various subject areas. Although a considerable amount of knowledge and experience has been developed in this field, exploring the possible mechanisms related to the exceptional properties of nanofluids is still in progress. Besides, scientists are eager of extending the application of the nanofluids in new areas.

Considering the importance of nanofluids, the Journal of Thermal Analysis and Calorimetry decided to establish the hot research topic of “Nanofluids” within its scope. In this regard, a special issue entitled “Nanofluid Today” was organized to exhibit the current status, developments, and future directions in the nanofluid area.

Following the call for submissions on December 24, 2017, we received 276 complete submissions for this special issue. All papers entered the review process were reviewed by at least two peer reviewers, where finally 106 manuscripts (from about 30 countries) were accepted to publish in this special issue. These accepted papers covered a range of applications of nanofluids which were as follows:

- Convective heat transfer, pool boiling heat transfer.
- Solar collectors, solar desalination, solar steam generation.
- Heat sinks, microchannels.
- Combustion.
- Phase change materials.
- Tribology.

- Oil recovery.
- Vapor compression cycle performance.

The survey on the accepted papers shows that 33% (35 papers) of the accepted papers are experimental study, 59% (63 papers) are numerical/analytical/theoretical studies, and lower than 8% (eight papers) are review papers.

The employed numerical methods to solve the flow and heat transfer of nanofluids were CFD approach, lattice Boltzmann method, Monte Carlo simulation method, molecular dynamic method, and several analytical methods, e.g., similarity solution, optimal homotopy analysis method, and Laplace transform method.

Several papers used machine learning and statistical approaches for predicting the characteristics of nanofluids or optimizing the performance of the nanofluids in some applications.

The experimental studies included synthesis, stability analysis, measuring the thermophysical properties, convective heat transfer, pool boiling, lubrication, vapor compression, solar heating desalination, and steam generation.

Various types of nanoparticles and based fluids were studied by the authors of the accepted papers as follows:

Basefluids:

Water; ethylene glycol; water/ethylene glycol mixture; polyalkylene glycol; carboxymethyl cellulose/water mixture; silicone fluids; mineral oil; thermal oil; polyol ester oil; diesel oil; C₁₀H₁₆; ethanol; paraffin wax; ionic liquid.

Nanoparticles:

OH-functionalized MWCNT and their composites with soft metal (Ag, Au, and Pd); MgO-MWCNT hybrid; graphene oxide; graphene; silicon carbide; TiO₂; Cu; CuO; CeO₂; Fe₂O₃; TiO₂; Al₂O₃; SiO₂; Al; Fe₃O₄; diamond; crystalline nanocellulose.

In conclusion, we believe that this special issue will lead to a wider use of nanofluids in industrial applications and stimulate the community for a long time.

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