



Editor's Preface for the Special Issue on Thermophysics of Advanced Spacecraft Materials and Extraterrestrial Samples

Yuji Nagasaka¹ · Hosei Nagano² · Eric Silk³ · Satoshi Tanaka⁴ · Matthias Grott⁵

Accepted: 26 May 2022 / Published online: 11 July 2022

© The Author(s), under exclusive licence to Springer Science+Business Media, LLC, part of Springer Nature 2022

In present and future planned planetary exploration space missions, spacecraft are exposed to a range of thermal environments, sometimes more extreme than those experienced while either on, or in earth orbit. The development of advanced thermal control materials and devices together with reliable and accurate measure of their thermophysical properties (spanning cryogenic to high temperatures) are needed for development of systems designed to meet the engineering challenges associated with these space missions.

Unmanned probes recently sent to celestial bodies within our solar system have either engaged in remote sensing, or sample retrieval and return to earth activities

This article is part of the Special Issue on Thermophysics of Advanced Spacecraft Materials and Extraterrestrial Samples.

✉ Yuji Nagasaka
nagasaka@sd.keio.ac.jp

Hosei Nagano
nagano@mech.nagoya-u.ac.jp

Eric Silk
esilk@umd.edu

Satoshi Tanaka
tanaka@planeta.sci.isas.jaxa.jp

Matthias Grott
matthias.grott@dlr.de

¹ Professor Emeritus, Keio University, Tokyo, Japan

² Department of Mechanical System Engineering, Nagoya University, Nagoya, Japan

³ Aerospace Engineering, University of Maryland A. James Clark School of Engineering, College Park, MD, USA

⁴ Department of Solar System Sciences, Institute for Space and Astronautical Science (ISAS, JAXA), Sagamihara, Japan

⁵ Department of Planetary Physics, German Aerospace Center (DLR), Berlin, Germany

for purposes of investigating their constituents. Thermophysical properties research on substances obtained from celestial bodies will provide fundamental scientific information regarding the process of evolution of our solar system.

This Special issue hosted by International Journal of Thermophysics is dedicated to outstanding research on this very challenging area and aims to publish original high-quality research papers covering the most recent advancements on the topic, as well as ample reviews addressing space-related topics.

Topics covered include, but are not limited to:

- Thermophysical properties of thermal control materials (e.g., heat transfer enhancement, insulation and storage)
- Optical properties for thermal control materials (e.g., surface coating, radiator and insulation)
- Thermophysical properties of working fluids for thermal control devices (e.g., pumped loop systems, liquid phase electronics cooling, phase change materials and stored cryogenics)
- Thermophysical properties of materials obtained by sample returned missions or meteorites
- Thermophysical properties of planetary simulant materials

The editors wish to thank to authors who have submitted excellent manuscripts to the Special Issue which have never been organized by any other international journals up to the present. The editors also wish to express our respect for reviewers who dedicated their time to provide valuable reviews.

Publisher's Note Springer Nature remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.