PAPER • OPEN ACCESS

Preface

To cite this article: 2022 *IOP Conf. Ser.: Mater. Sci. Eng.* **1270** 011001
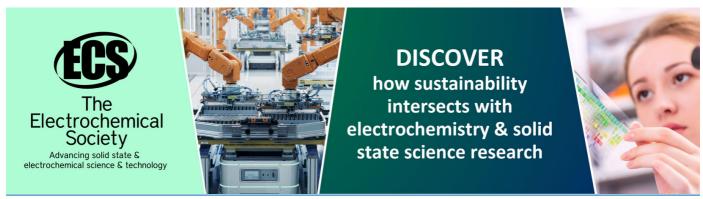
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Preface

Metal forming is a crucial and irreplaceable manufacturing technology, since it can efficiently produce components with micro-nano size, large size, complex structure and excellent performances used in the fields of aerospace, automotive, nuclear, ocean engineering, etc. Metal forming involves in the variation of geometrical shape and microstructure under the interactions of force, thermal, electric and magnetic, and the realization of coordinated control of shape and property is the widespread goal of metal forming. With the rapid development of modern society, light-weight, short process, extreme forming, green forming, and intelligent control have become the primary keywords of metal forming. Hence, developing new forming processes or innovating the traditional processes always attract the interests of scientists, academics and engineers. The International Conference on Metal Forming exactly provides a very good academic platform for the researchers throughout the world to share and communicate their latest findings in metal forming.

The International Conference on Metal Forming was founded by AGH University of Science and Technology, Poland, in 1974. From 1994 to 2010, the Conference was organized every two years, jointly with University of Birmingham, UK. In 2010, University of Birmingham was replaced by Toyohashi University of Technology, Japan, and the Conference went to Japan for the first time. Metal forming 2012 was organized by AGH University of Science and Technology, together with Toyohashi University of Technology and University of Palermo, Italy. Metal forming 2014 and 2016 were respectively held by University of Palermo and AGH University of Science and Technology, whereas the Conference was organized by Toyohashi University of Technology in 2018 and came back to AGH University of Science and Technology in 2020. This year, the 19th International Conference on Metal Forming (Metal Forming 2022) was held online through a combination of live and video streaming due to the impact of global COVID-19 on September 11-14 by the China Society for Technology of Plasticity, CMES, P.R. China.

The conference papers of the 19th International Conference on Metal Forming are collected in this issue. During the conference, 293 papers (including abstracts) were submitted by authors representing universities, research institutes and industry from 16 countries, and 124 papers are included in the issue of *IOP Conference Series: Materials Science and Engineering*. In terms of the research objects, materials such as steel,

aluminium alloys and titanium alloys are still the focus, while materials such as high-temperature alloys and hard-to-deform alloys have received significantly more attention as well, and the theoretical research on material property, microstructure evolution, mechanical analysis of deformation processes and constitutive modeling have been continuously improved. In terms of forming processes, traditional forming processes such as forging, extrusion, stamping, rolling, etc. have been further developed in terms of deformation theory and process optimization, and the research on special forming technologies such as electromagnetic forming, ultrasonic vibration-assisted forming, flexible incremental forming, micro-forming, and laser forming, etc. have become more mature. With the continuous optimization and innovation of materials and forming processes, as well as the accuracy, reliability, and automation & intelligent development of forming equipment, the forming of many complex components with demanding requirements on precision, performance, and service environment has become increasingly possible.

We would like to express our sincere gratitude to the Members of the Scientific Committee who made great efforts to review and revise the conference papers, ensuring the quality and scientific level of the papers. We hope that the proceeding will serve as a window into the latest advances in metal forming for academics, researchers, engineers, and students.

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