The International Association for the Properties of Water and Steam

2019 Annual Meeting
September 29-October 4, 2019
The Banff Centre for Arts and Creativity, Banff, Alberta, Canada

Press Release

International Association for the Properties of Water and Steam (IAPWS)
2019 Executive Committee and Working Group Meetings

Banff, Canada, September 29th – October 4th, 2019

Between September 29th – October 4th, 2019, 92 scientists, engineers and guests representing 16 countries descended on the Banff Centre for Arts and Creativity in Banff, Alberta, Canada for the annual meeting of the IAPWS Executive Committee and Working Groups. This continues a series that began in 1929 in London, UK with the purpose to connect researchers and scientists with the engineers who use their work providing the researchers with guidance on topical problems within industry and providing the engineers with the latest research results. Areas of application include power cycle chemistry, high temperature aqueous technologies applicable to steam cycles and steam injection, the use of high temperature water and supercritical steam in chemical and metallurgical processes, supercritical synthesis of new materials and destruction of toxic wastes, hydrothermal geochemistry, hydrometallurgy, oceanography and global climate modelling, power cycles with CO_2 capture and storage systems and combined heat and power systems.

IAPWS produces releases and guidelines on the recommended scientific formulations for physical and chemical properties of water in its various forms as well as technical guidance documents that are the concerted opinion of IAPWS members on the best operating practices for power plant chemistry. IAPWS also documents certified research needs that represent the opinion of experts in their respective fields that a research topic is greatly needed to fill a current gap in knowledge. All this information is freely available and can be found on the IAPWS website at www.iapws.org.

The IAPWS Helmholtz award is given annually to developing or early career scientists and engineers who are working in a field of interest to IAPWS. It includes an opportunity to attend the IAPWS meeting to present the Helmholtz Award lecture during the IAPWS Symposium, typically held on the Wednesday of the IAPWS working week. This year, the Helmholtz award was presented to Dr. Václav Vinš from the Institute of Thermomechanics of the Czech Academy of Sciences, Czech Republic for "achievements in the research of

thermophysical properties of water and aqueous systems, in particular surface tension of metastable supercooled water and phase equilibria involving gas hydrates."

During the IAPWS banquet that was held at the Brewster's Mountview Barbeque just outside of Banff, Michael Rziha from Germany was acknowledged as an IAPWS Honorary Fellow for leadership and service to the Power Cycle Chemistry working group.

IAPWS, through the various working groups, produces guidelines, technical guidance documents (TGD) and IAPWS certified research needs (ICRN). These can all be found for free download on the IAPWS website at www.iapws.org. Throughout the week, the working groups progressed their activities, which are reported below.

The Working Group on Thermophysical Properties of Water and Steam (TPWS) received a new formulation for the viscosity of heavy water, consistent with the new equation of state for heavy water that was adopted in 2018. This will be evaluated in the coming year with the intention of official adoption by IAPWS in 2020. A corresponding formulation for the thermal conductivity of heavy water should follow soon after. TPWS is considering new information available since the 1995 adoption of the IAPWS formulation for the thermodynamics of ordinary water, with the intention of producing a new standard over the coming years. Toward that end, an IAPWS Certified Research Need (ICRN) was authorized to document the areas in which new thermodynamic data for water would be most useful.

The Subcommittee on Seawater (SCSW) met and discussed progress on the difficult problem of making absolute density measurements of Standard Seawater, and the slightly easier problem of making density measurements relative to the density of freshwater. A number of members also discussed issues related to pH and its measurement in high ionic strength liquids like seawater. Finally, a new IAPWS guideline on the viscosity of seawater was endorsed.

The main topics discussed in the Industrial Requirements and Solutions (IRS) Working Group were the engineering requirements for prevention of coarse-droplet erosion in wet steam flow and improvement of IAPWS formulations in metastable subcooled vapor for computation fluid dynamics (CFD) calculations. Some items, like proper methods or new models for estimating low sulfur dew point in GTCC and mixed properties of geothermal steam, are opening discussions on new methods and potential for new IAPWS releases to be worked on by a joint task group and liaison with other specialists.

The Physical Chemistry of Aqueous Systems (PCAS) working group discussed the self-diffusion of water and the development of a correlation function to model self-diffusion, theoretical and computational approaches to nucleation in water vapor, modeling of acid-base equilibrium for humic substances, and density and surface tension of aqueous mixtures at low temperatures. Development of an IAPWS guideline on the Self-Diffusion of Water is in progress and is currently at an advanced stage.

The Power Cycle Chemistry (PCC) working group had an extremely productive meeting with Technical Guidance Document (TGD) work including key areas such as air in-leakage, film forming substances (FFS) in industrial plants and chemistry management in generator water

cooling. Several white papers and new TGDs are in progress including FFS for nuclear plants, corrosion product monitoring for cycling plants, demineralizer system integrity and reliability, geothermal steam chemistry and flue gas condensation. The number of TGDs continues to increase providing robust, practical and technically correct water and steam guidance to industry. As well as the new TGDs, existing TGDs are being reviewed and updated to ensure they are kept up to date and relevant. Additional PCC technical discussions were held, and work was started in the area of oil sands applications and electric boilers. PCC-related International Collaborations (IC) continue between Canada and New Zealand (corrosion of boiler steels in presence of mixed contaminants) and a new IC was approved related to Corrosion Product Sampling, Analysis and Assessment to provide more data to the PCC corrosion product sampling and analysis project.

The Executive Committee reviewed and approved all the above-mentioned working group activities and also approved and welcomed the Indian Association for the Properties of Water and Steam (INDIAPWS) as a new Associate Member.

IAPWS welcomes scientists and engineers with interest in the thermophysical properties of water, steam, and aqueous systems and in the application of such information to industrial uses. The next IAPWS meeting will be in Turin, Italy from 6th – 11th September 2020. Further information on meetings can be found at the IAPWS website (www.iapws.org) as it becomes available. People interested in IAPWS documents and activities should contact the chairman of their IAPWS National Committee (see website) or the IAPWS Executive Secretary, Dr. Barry Dooley, bdooley@iapws.org . People do not need to be citizens or residents of member countries to participate.

Participants at the Annual IAPWS Meetings and Symposium
Banff Centre for Arts and Creativity, Banff, Alberta, Canada