Press Release

International Association for the Properties of Water and Steam

2015 ANNUAL MEETING, STOCKHOLM, SWEDEN

Continuing a series of conferences that began in 1929 in London, 88 scientists and engineers from 21 different countries, along with 14 accompanying persons, attended the annual meeting of the International Association for the Properties of Water and Steam (IAPWS). The Scandinavian National Committee of IAPWS (SIAPWS) hosted the meeting between 28th June and the 3rd July 2015 at the Scandic Ariadne hotel in Stockholm, Sweden. The highlights of the IAPWS working group sessions and other proceedings of the executive committee are summarised in this release.

The primary purpose of the annual IAPWS meeting is to connect researchers and scientists with the engineers who use their information. This information exchange provides the researchers with guidance on topical problems within industry and provides the engineers with the latest research results. Areas of application include power cycle chemistry, high temperature aqueous technologies applicable to steam cycles and fuel cells, 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, power cycles with CO_2 capture and storage systems and combined heat and power systems including district heating.

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 best operating practices for power plant chemistry. IAPWS also documents certified research needs that represent the opinion of experts in their respective fields that research on a particular subject is greatly needed to fill a current gap in knowledge. All of this information is freely available and can be found on the IAPWS website at **www.iapws.org**.

In the Working Group on Thermophysical Properties of Water and Steam (TPWS), a new Guideline was approved on the thermodynamic properties of supercooled water. This new formulation provides the best available information for this important and scientifically interesting condition of water. New Guidelines were also approved on the fugacity of water and humid air (important in atmospheric science and humidity measurement) and on the thermal conductivity of seawater. Significant ongoing and new work includes efforts toward improved formulations for the surface tension of water, the thermodynamic properties of water in the ideal-gas state, and the thermodynamic properties of heavy water.

The Industrial Requirements and Solutions (IRS) working group finalized and approved the "IAPWS Guideline on the Fast Calculation of Steam and Water Properties with the Spline-Based Table Look-Up Method (SBTL)". The development of this guideline, which has occurred over the past several years, will allow for calculation of water and steam properties with substantially higher calculation speed while keeping the same accuracy as the current standard IAPWS-IF97. This method will be very beneficial for applications requiring extensive computation of H_2O properties such as Computational Fluid Dynamics, transient power cycle simulations, etc.

The Subcommittee on Seawater (SCSW) met during the week and discussed many issues related to the bulk properties of seawater, as measured in both the laboratory and in the field, and is continuing efforts to define a traceability chain between the TEOS-10 Seawater standard and the International System of Units (SI). A report was presented by the Joint SCOR/IAPWS/IAPSO Committee on the Properties of Seawater (JCS) which showed that worldwide use of the TEOS-10 Seawater Standard is increasing, with software and document downloads increasing each year. TEOS-10 is built around several IAPWS releases including the 1995 formulation on the Thermodynamic Properties of Ordinary Water Substance and the 2008 Release on the Thermodynamic Properties of Seawater.

In the meetings of the Power Cycle Chemistry (PCC) working group, major progress was achieved by finalizing amendments for the Technical Guidance Document (TGD) on instrumentation, as well as for two TGDs on chemical treatments (Volatile and Phosphate / Caustic) for providing guidance for cycling and fast start-up plants. All three amendments were submitted for approval to the Executive Committee and are ready for immediate release. Additional discussions and work undertaken was to begin the preparation of three new TGDs for planned release at the 2016 meeting. These include guidance on the use of film forming amines in water/steam cycles; guidance for HRSG HP evaporator tube sampling and deposit analysis; and, guidance for high purity demineralized makeup water integrity.

In collaboration with TPWS working group and SCSW, the Physical Chemistry of Aqueous Solutions (PCAS) working group has completed work on the Guideline for the thermal conductivity of seawater. The Guideline has been formally submitted to the Executive Committee for approval. Throughout the week, the working group discussed and identified topics for forthcoming Guidelines including providing IAPWS recommended formulations for the dissociation and vapor-liquid distributions of various amines used in the water/steam cycle and, for self-diffusion in high-temperature water.

IAPWS produces Certified Research Needs (ICRNs) as guidance for funding agencies and as an aid to people doing research in defining important research. To date, these have covered a variety of areas related to the properties of water and steam, seawater and the chemistry of power plants. A list of currently active ICRNs and closing statements on the progress made for those that have expired can be found on the IAPWS website.

A symposium entitled "Energy Planning and Technical Solutions" was held on Wednesday 1st July 2015**.** The symposium included several presentations focused on combined heat and power systems based upon biomass combustion systems that are prevalent in Sweden. Further presentations were given on the modeling of aqueous electrolyte systems including carbon capture and storage, aqueous reactions with biomass, corroding interfaces and mitigating the consequences of nuclear accidents. The IAPWS Helmholtz award lecture is traditionally the cornerstone of the IAPWS Symposium; unfortunately, this year's award

winner Dr. Vincent Holten, a Postdoctoral Associate at Cornell University, could not attend. His work and the planned topic of his presentation surround computational thermodynamics and statistical mechanics of aqueous solutions of hydrophobic substances. 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 annual IAPWS meeting and to present the Helmholtz Award lecture.

The IAPWS Honorary Fellow award was conferred during the meeting banquet, which was held in the historic "Vasa Museum". The Honorary Fellow award is given in recognition of many years of contribution to the Association. At the 2015 meeting, the recipient of the IAPWS Honorary Fellow award was Professor Masaru Nakahara from Kyoto University in Japan in recognition of his outstanding contribution for sustained and exemplary service to IAPWS through the Working Group on Physical Chemistry of Aqueous Systems, leadership of the Japanese National Committee for IAPWS, and profound research results in the chemistry of aqueous solutions.

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 Dresden, Germany from 11^{th} – 16^{th} September 2016. 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 Chairs of their IAPWS National Committee (see the IAPWS website for contact details) or contact the IAPWS Executive Secretary, Dr. R. Barry Dooley, bdooley@structint.com. People do not need to be citizens or residents of member countries to participate in IAPWS activities.

	
SIAPWS Organizing Committee for the 2015 Annual Meeting in Stockholm, Sweden.	Participants of the SCSW working group during the annual meeting.

Group photo of the participants of the 2015 IAPWS meeting, Stockholm, Sweden.

2015 IAPWS dinner at the Vasa Museum, Stockholm, Sweden.

Professor Masaru Nakahara from Kyoto University, Japan, receives the 2015 IAPWS Honorary Fellow Award from IAPWS President, Dr. David Guzonas.