

REPORT

on IAPWS-related activities: May 2016 – May 2017

submitted by the

Czech National Committee for the Properties of Water and Steam (CZ NC PWS)

to the Executive Committee Meeting of 2017 IAPWS Meeting, Kyoto, Japan, September 2017

National Committee | Contact

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Participating institutions

The following Czech Institutions participated in the research of thermophysical properties and chemical processes between May 2016 and May 2017:

Institute of Thermomechanics of the CAS, v. v. i., (“IT CAS”), Department of Thermodynamics, Dolejšková 1402/5, CZ-182 00 Praha 8

Czech Technical University in Prague (“CTU”), Faculty of Mechanical Engineering, Department of Fluid Mechanics and Thermodynamics, and Department of Power Engineering, Technická 4, CZ-166 07 Praha

Institute of Chemical Technology, Prague (“ICT”), Department of Power Engineering (“ICT-DPE”) and Department of Physical Chemistry (“ICT-DPC”), Technická 5, CZ-166 28 Praha 6

University of West Bohemia (“UWB”), Faculty of Mechanical Engineering, Department of Power System Engineering, Univerzitní 8, CZ-306 14 Plzeň

DOOSAN ŠKODA POWER, Plzeň, Inc., Tylova 57, CZ-316 00 Plzeň

Technical University of Liberec (“TUL”), Department of Chemistry, CZ-461 19 Liberec

SIGMA Research and Development Institute Ltd. (“SIGMA”), Jana Sigmunda 79, CZ-783 50 Lučín

University of South Bohemia (“USB”), Faculty of Science, Branišovská 31A, CZ-370 05 České Budějovice

The founder of CZ NC PWS is the Czech Academy of Sciences.

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Board of CZ NC PWS for 2014-2017:

Dr. T. Němec
Dr. J. Hrubý
Prof. R. Mareš
Prof. P. Šafařík
Prof. J. Šedlbauer

List of IAPWS-Related Activities

The international collaboration between CZ NC PWS and IAPWS was funded from the project of IT CAS and TUL sponsored by MŠMT since 2016 (project no. LG15040). The project support will end on 31/12/2017.

Dr. Hrubý and Dr. Vinš (IT CAS) and their collaborators from IT CAS, UWB, USB and abroad continued their experimental investigation of surface tension of supercooled water [1,2].

Dr. Hrubý (IT CAS) has completed a multi-year collaborative project with a group of molecular spectroscopists and quantum chemists focused on calculation of properties of water molecules composed of ^1H [3] and deuterium ^2H [4] and three isotopes of oxygen, ^{16}O , ^{17}O , and ^{18}O . The resulting thermodynamic data replaces previous data that were several decades old. The uncertainty of the new data in the technically most relevant temperature range up to $1,000^\circ\text{C}$ is much smaller than the uncertainty of any thinkable thermodynamic measurement. The new data has already been used for the development of the new IAPWS equation of state for heavy water.

Assoc. Prof. Kolovratník (CTU) and Dr. Bartoš (CTU/IT CAS) carried out pneumatic and optical measurements of a wet steam flow upstream of the last stage of a nuclear-power-station steam turbine [5-9]. On September 12-14, 2016, the Wet Steam Conference 2016 was held at the Faculty of Mechanical Engineering of Czech Technical University.

Prof. Šafařík (CTU) had a Keynote Lecture on the speed of sound in steam [10] and published a book on thermodynamics of moist air [11].

Dr. Sedlář (SIGMA) and his collaborators studied cavitation erosion in water pumps and the problem of cavitation instabilities under hydrodynamic conditions [12, 13].

The team of Prof. Šedlbauer (TUL) published a paper [14] on chemical and biological process engineering and Prof. Majer (TUL) studied solubility data on correlation of solubility [15-16].

The team of Assoc. Prof. Hnědkovský (ICT-IPC) studied thermodynamic properties of aqueous solutes in water [17-24].

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