Report on IAPWS-related activities: May 2015 – May 2016

submitted by the

Czech National Committee for the Properties of Water and Steam (CZ NC PWS)
to the Executive Committee Meeting of 2016 IAPWS Meeting, Dresden, Germany, in September 2016

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Participating institutions

The following Czech Institutions participated in the research of thermophysical properties and chemical processes between May 2015 and May 2016:

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The founder of the CZNCPWS is the Czech Academy of Sciences.

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Board of CZ NC PWS for 2014-2017

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

List of IAPWS-Related Activities

The project of IT CAS sponsored by the Ministry of Education, Youth and Sports of the Czech Republic has been the source of financial support for the international collaboration of CZNCPWS with IAPWS since 2016. The project support will end on 31/12/2017.

Dr. Hrubý and Dr.Vinš (IT CAS) and their collaborators from IT CAS continued their experimental investigation of surface tension of supercooled water [1,5,6,7] and density of supercooled water at elevated pressures [6,7]. In joint cooperation with the team of Prof. Roland Span form Ruhr-University Bochum they progressed in modeling of gas hydrates relevant to carbon capture and storage [3,4]. In addition, the vapor-liquid phase interface of water was studied using molecular dynamic simulations [2,7].

Prof. Mareš (UWB) and Dr. Kalová (USB) studied surface tension of water and water nanodroplets [8-9].

Dr. Němec (IT CAS) studied bubble nucleation in binary systems of liquid solvent and dissolved gas. His theoretically model enabled him to evaluate the influence of dissolved gas concentration in water on the process of bubble formation [10].

Assoc. Prof. Kolovratník (CTU) and Dr. Bartoš carried out pneumatic and optical measurements of a wet steam flow field upstream of the last stage of a nuclear power-station steam turbine. This unique measurement has produced useful new information for the manufacturer and operator of the steam turbine and valuable experimental data for phase transition modelling in wet steam flows [11].

Mr. Nový (DOOSAN ŠKODA POWER) and his collaborators studied the speed of sound in steam [12] and carried out numerical simulations of flow with condensation in nozzles based on homogeneous nucleation.

Dr. Sedlář (SIGMA) and his collaborators studied cavitation erosion in water pumps [13] and the problem of cavitation instabilities in hydrodynamic conditions [14-16].

The team of Prof. Šedlbauer investigated thermodynamic properties of H2S-H2O-NaCl solutions [17].

The team of Assoc. Prof. Hnědkovský (ICT-IPC) studied thermodynamic properties of aqueous solutes in water [18-25].

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