Editorial: Ideology, general pragmatic direction and subject matter of a special IAHE series of international conferences, 'Hydrogen Economy and Hydrogen Treatment of Materials' (HTM–Conferences, Donetsk, Ukraine)

Victor A. Goltsov

Donetsk National Technical University
58 Artyom Street, Donetsk 83000, Ukraine
E-mail: Goltsov@physics.dgtu.donetsk.ua

Biographical notes: Victor A. Goltsov is a member of the Board of Directors of the International Association for Hydrogen Energy (IAHE), a member of the Honorary Editorial Board of the *International Journal of Hydrogen Energy* (IJHE) and the *International Journal of Nuclear Hydrogen Production and Application* (IJNHPA) and the Chairman of the Physics Department and Head of the Donetsk State Hydrogen Laboratory of the Donetsk National Technical University. Over a period of several decades, he has been elaborating hydrogen materials problems and general questions of hydrogen energy (http://donntu.edu.ua/hydrogen). As a Chairman of the triennial IAHE special international conference 'Hydrogen Economy and Hydrogen Treatment of Materials', he represents the IAHE and IJHE's long-term goals and activities in Eastern Europe and North Asia (countries of the Community of Independent States).

1 Introduction

In the history of the hydrogen movement and among a lot of hydrogen conferences, the series of Hydrogen Economy and Hydrogen Treatment of Materials (HTM) conferences has occupied its own place and has its own 'face'. This is conditioned by the important role of the hydrogen materials problem in the industrial development of humankind. In this connection, I shall mention only one very prominent historical example.

Since the 1950s, the world community of physicists has been working very hard on a thermonuclear energy problem. By the early 1970s, almost all of the physical tasks of the problem were resolved. Then, there was euphoria and the problem was widely discussed in the scientific and the public press. It seemed at that time that very soon, it would be possible to build fusion stations to produce thermonuclear energy for human needs. But it 'was discovered' that engineering and materials problems had not been solved: the alloy for the first wall of the fusion reactor, its interaction with hydrogen isotopes and the like. And you know what has happened! Only after about 40 years, a dream of the 1970s has become a reality: the International Thermo-Nuclear Reactor (ITER) will be built in France by the EU, the USA, Russia, Japan, China and other countries participating in the ITER project.

By the late 1980s, it became absolutely evident that the idea of hydrogen energy rests on the same infertile ground: the actively forming world hydrogen energy community did not comprehend all the importance of the hydrogen materials problem for the successful development of hydrogen energy.

By the early 1990s, the International Association for Hydrogen Energy (IAHE, USA) the Donetsk National Technical University (DonNTU, Ukraine), the Donetsk State Hydrogen Laboratory (DonSHL, Ukraine) and the Federal State Unitary Enterprise Scientific and Industrial Complex 'Supermetal' (FSUE SIC 'Supermetal', Russia) established a new special IAHE series of HTM conferences, which were then held triennially on the base of DonNTU and supported by FSUE SIC 'Supermetal' as a co-organiser and the general sponsor.

During the last 15 years, the hydrogen energy concept has been steadily developed (see the *International Journal of Nuclear Hydrogen Production and Application*, 2006, Vol. 1, No. 2) and the movement of humankind along the ecologically clean vector 'hydrogen energy → hydrogen economy → hydrogen civilisation' is now in actual practice. In accordance with this reality, the ideology, pragmatic direction and subject matter of the HTM conferences have been permanently updated.

2 The main point of the HTM conferences' ideology

At this historical moment, a crucial question for the world hydrogen movement is a necessity for a wide information exchange among the leading representatives of three communities: the hydrogen energy community, the hydrogen-materials-safety one and industrialists, who have an experience of hydrogen production and use. With good reason, one can expect that just this exchange of views and knowledge will initiate a new understanding of the main bifurcation points on the way to a hydrogen civilisation.

3 The general pragmatic direction of the HTM conferences

This is the general direction of the conferences:

- Hydrogen Economy and Materials: safety and efficiency in the use of hydrogen in the up-to-date industry, in hydrogen energy technologies and the problems of transition to the hydrogen civilisation of the future.
- The proceedings of the conference are to be published before it starts. The conference results are summarised and brought to the attention of the worldwide hydrogen movement and all the scientific and cultural communities of the world.

4 The subject matter of the HTM conferences

4.1 Plenary sessions

- Advances in the vectorial movement of 'hydrogen energy → hydrogen economy → hydrogen civilisation'
- Safety and efficiency of materials for the up-to-date industry, hydrogen technologies and hydrogen energy systems.

4.2 Section sessions

- Theory and technology of hydrogen treatment of materials
- Noble and rare metals in fuel cells and hydrogen energy technologies
- Hydrogen degradation of materials; prevention of unpredicted hydrogen wrecks in the gas, chemical, petrochemical and atomic industries and hydrogen energy technologies.

4.3 Round table meetings

- Hydrogen economy and materials – Are there any troubles on the road towards a hydrogen civilisation?

To know more about the HTM community and HTM conferences, please see the *International Journal of Hydrogen Energy* (1997, Vol. 22, Nos. 2–3; 1999, Vol. 24, No. 9; 2002, Vol. 27, Nos. 7–8; 2006, Vol. 31, No. 2). Additional information can be found on our website (http://donntu.edu.ua/hydrogen/).

The Fifth International HTM Conference 'Hydrogen Economy and Hydrogen Treatment of Materials' (HTM 2007) was held on 22–25 May 2007 in Donetsk, Ukraine. Scientists and engineers representing 28 countries, participated. The proceedings of HTM 2007 (two volumes, 952 pages) were published before the conference.

There was discussion of the progress of humankind along the ecologically clean vector 'hydrogen energy → hydrogen economy → hydrogen civilisation' and the Memorandum on a Novel IAHE Conception of Hydrogen Civilization of the Future: Historical Aspects and New Challenges of the Present Day was adopted. The memorandum provides the historical and theoretical background of the transition into the era of hydrogen civilisation.

The HTM 2007 conference also carefully discussed the problem of hydrogen materials and its important aspects were understood. One of these is: "The main challenge is to prevent, in the near future, a commercialization crisis in the hydrogen economy induced by a deficiency in platinum metals." In 10–15 years, the demand of the hydrogen economy for platinum metals will be as much as 180–200 tonnes per year. That will provoke a crisis of supply in the platinum metals market and, hence, a crisis in the development of the hydrogen economy. Without any doubt, the world hydrogen and platinum communities' attention must be focused on this crucial problem.

This special issue of IJNHPA and the previous one (2008, Vol. 1, No. 4) present a possibility for its readers to get acquainted with some representatives of the HTM community and their reports at the Fifth International HTM Conference.

In conclusion, let me wish you, readers of *IJNHPA* – active members of the world hydrogen movement – great success in your hydrogen research activity.