

Event:
Date:
Place:

ENERGY in BUILDINGS 2022
Saturday December 10, 2022
Athens, Hellas



#	Emmanuel Stamatakis Chemical Engineer, PhD	
Title:	Head of Business Development and Research at CYRUS S.A., Athens & Researcher at the Institute of Geoenergy/FORTH, Chania, Greece	
email:	estamatakis@h2cyrus.eu ; estamatakis@ipr.forth.gr	•
Presentation title:	An Innovative Thermal Hydrogen Compression using Metal Hydrides for Transport and Stationary Applications	
	<p>Hydrogen compressors account for over 50% of the total capital cost of a hydrogen refueling station (HRS) for vehicles. Moreover, they are a critical component for stationary power applications as well, therefore they will play a significant role towards "Hydrogen Economy". More specifically, in the transport sector, it is estimated by the European Commission that the potential market share of hydrogen vehicles will be in the order of 0.3 – 0.4% of the total vehicle stock. Metal Hydride Compressors (MHC) without moving parts demonstrate significant advantages over conventional mechanical compressors, such as: slightly lower capital cost, significantly lower operation and maintenance cost, higher availability and reliability and almost zero noise. Here we present the results of the development phase of a thermal compression system based on metal hydrides using only water as the cooling / heating medium. The main concept of the MHC lies in the selection of appropriate alloys, which work in different inlet and outlet pressures and allow pressure increase in stages. The work deals also the next steps towards MHC introduction to the hydrogen market, the identification of the existing barriers and the methods to overcome these.</p> <p>This work is co-financed by the European Regional Development Fund of the EU and Greek national funds under the call RESEARCH – CREATE – INNOVATE (project H2CYRUS_T1EDK-02151).</p>	
Short CV:		
	<p>PhD in Chemical Engineering; Master in Production Management. Currently he holds a Research Position at the Institute of GeoEnergy of the Foundation for Research and Technology - Hellas on Environment & Renewable fuels. He is also the Head of Business Development and Research at CYRUS S.A., a spin-off company of NCSR DEMOKRITOS that develops innovative thermal hydrogen compression systems.</p>	

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PhD in Chemical Engineering (thesis on flow in porous media using radiotracers); Master in Production Management Systems (thesis on Multi-Criteria Decision Making for the optimal choice of a desalination technology). Currently he holds a Research Position at the Institute of GeoEnergy (IG) [former Institute of Petroleum Research (IPR)] of the Foundation for Research and Technology - Hellas (FORTH) on Environment & Renewable fuels. He is also the Head of Business Development and Research at CYRUS S.A., a spin-off high tech company of NCSR DEMOKRITOS that develops innovative thermal hydrogen compression systems. In the past he has been working as a Research Collaborator for various Research Centers in Greece and abroad for over 15 years in the fields of Petroleum Research, Renewable Energy, Hydrogen Technology and Environmental Protection. He has been acting as the main liaison between the industry and the research community on various hydrogen energy & environmental issues during his career, having fulfilled a large number of industrial research programs through his active participation in all stages, from the preparation and submission of the proposal until the successful completion of the project, having delivered numerous industrial technical reports. Involved as a research scientist in various National & International environmental & hydrogen energy projects such as: SHIP-FC - Piloting Multi MW Ammonia Ship Fuel Cells (NCSR, Greece); DEMO4GRID – Demonstration of 4MW Pressurized Alkaline Electrolyser for Grid Balancing Services (DBC, Greece); PERL - Enhancing the research potential of the NCSR Environmental Research Laboratory (NCSR, Greece); STORIES – Addressing barriers to Storage technologies for increasing the penetration of Intermittent Energy Sources (CRES, Greece); ENGINE - Enhanced Geothermal Innovative Network for Europe (NCSR, Greece); KMBSCALE for the study of calcite scale formation in production wells using nuclear techniques (IFE, Norway); HDR-geo for the simulation of scale deposition in geothermal installations (IFE, Norway); ARISSTON for the experimental investigation of scaling in core samples using radioactive tracers (IFE, Norway). Significant experience in project management and project proposal preparation & evaluation.