

סמינר - SEMINAR

הנדך מוזמנת להרצאה סמינריונית של הפקולטה להנדסת מכונות, שתתקיים ביום ב' 31.12.2018
(כג' בטבת, תשע"ט), בבניין דן קאהן, אודיטוריום 1, 14:30.

מרצה:

Dr. Leonid Tartakovsky

Senior Research Fellow
Faculty of Mechanical Engineering

על הנושא:

Fuel reforming for improvement of propulsion efficiency and emissions mitigation

The seminar will be given in Hebrew

להלן תקציר ההרצאה:

The climate change, security of energy supply and air pollution challenges require development of new propulsion concepts enabling meeting CO₂-neutral economy and zero-impact emission requirements, applying highly-efficient energy conversion processes and using renewable energy sources. Recent studies show that electric vehicles do not really constitute a zero-emission option because of emissions of highly harmful non-exhaust particles. Internal combustion engines (ICEs) fed by electrofuels or renewable fuels have a potential to meet these challenges most successfully. In the lecture, we describe a newly developed general concept of High-Pressure Thermochemical Recuperation (TCR) that in ICE-based application makes possible simultaneous dramatic improvement in energy efficiency and emissions reduction to zero-impact levels without any need in exhaust gas aftertreatment. This is achieved through burning the produced onboard hydrogen-rich reformat fuel, whereas waste heat utilization provides an additional boost of energy efficiency. We go beyond the previous studies in this field that suffer from engine power loss, abnormal combustion and transient behavior problems by suggesting high-pressure fuel reforming, direct reformat injection and system integration into a series hybrid configuration. We have built and successfully investigated a first ever laboratory prototype of a direct-injection ICE with High-Pressure TCR. The obtained experimental results show that energy efficiency is improved by 20%-30% and pollutant emissions are reduced by up to 97%, 91% and 96% for NO_x, CO and HC emissions, respectively, compared with gasoline in a wide power range without any need in exhaust gas aftertreatment. The described concept is the only known TCR method that enables full fuel replacement by a reformat with a consequent gain in efficiency and emissions mitigation. Applications of this reforming concept include, but not limited to automotive and stationary energy production appliances.

בברכה,

ד"ר לניד טרטאקובסקי

מרכז הסמינרים