Grand Technion Energy Program
תוכנית האנרגיה ע"ש גרנד

Technion Israel Institute of Technology

תכנית האנרגיה ע"ש גרנד מתכבדת להזמינך להרצאה סמינריונית שתינתן ע"י:

אורן אלישב

התכנית הבין-יחידתית לאנרגיה

בנושא:

The Nitrogen Economy: Fertilizing the Energy Mix

Establishing a secure, economical and sustainable global energy system is one of the most urgent and significant challenges our society must address today. Integration of intermittent renewable energy sources, such as solar and wind to our future grid needs to be accompanied by large-scale energy storage solutions. Hydrogen from seawater was previously suggested as an energy storage media. However this requires major scientific efforts to make this process efficient and cost effective. Once hydrogen is available, chemical storage of hydrogen will be required. Large scale chemical hydrogen storage can be achieved in the form of carbon or nitrogen based fuels. The global accessibility of nitrogen in the atmosphere can facilitate intense production of ammonia and its fertilizer derivatives to be utilized as fuels.

This work aims to answer three fundamental questions: Why nitrogen based fuels should be used as energy carriers? When this technology will be feasible? And how can we utilize these fuels in an efficient and environmentally clean way. In order to address the above questions, we approached these problems in an interdisciplinary fashion. We conducted an energy-based analysis to compare nitrogen-based fuels to synthetic carbon-based fuels. A preliminary economic case study was demonstrated. In addition the auto ignition of a model nitrogen based fuel was investigated to find the boundary conditions that support clean and efficient combustion of one of these fuels.

The results show that expanding the nitrogen economy to the energy sector by implementation of nitrogen based fuels can fertilize our energy portfolio and be an enabling key for implementing renewable energy sources.

מנחים: פרופ' גדעון גרדר, ד"ר גנדי שטר, פרופ' דניאל לוין, הפקולטה להנדסה כימית

במסגרת עבודת מחקר לתואר מגיסטר

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