



Public Lecture by Nobel Laureate: Biofuels - can they help to reduce global warming or to solve the energy crisis?

Abstract:

The global warming has been undoubtedly accepted to be the result of an increased concentration of greenhouse gases such as carbon dioxide and methane in the atmosphere. There is no time to wait for us to switch from energy mainly based on fossil energy to renewable energy. The Nobel Laureate Hartmut Michel presented an inspiring public lecture to discuss how to take advantage of biofuels together with solar energy to help solve the global warming problem.

On July 1st, 2009 in University Cultural Centre, National University of Singapore (NUS), the Nobel Laureate Hartmut Michel presented an inspiring public lecture with the title of "Biofuels - can they help to reduce global warming or to solve the energy crisis?" It is one of the three public lectures by Nobel Laureates organized in conjunction with ICMAT 2009 and IUMRS-ICA 2009. This seminar attracted more than 500 students and researchers.

Dr. Michel is the professor of biochemistry at the Johann Wolfgang Goethe University and has been the director of the Molecular Membrane Biology Department at the Max Planck Institute for Biophysics since 1987. For the success with the crystallization of membrane proteins and the elucidation of the three-dimensional structure of the photosynthetic reaction centre from the purple bacterium *Rhodospseudomonas viridis*, he was awarded the Nobel Prize in Chemistry (together with J. Deisenhofer and R. Huber) in 1988.

Prof. Michel gave a one-hour lecture to discuss how to take advantage of biofuels together with solar energy to help solve the global warming problem. He explained the theoretical limit for the efficiency of photosynthesis is around 4.5% but in reality less than 1% of the sunlight energy is stored in the form of biomass. He discussed 60% of the energy in the harvested potatoes came from the fossil fuels. He showed an example how farms can earn more by selling energy by biomass than by selling milk. At last, Prof. Michel highlighted his vision to set up 3~4 big Photovoltaic fields (including Sahara, Gobi and Australia deserts) throughout the world connected by superconducting cable that can supply all electric power required by man power.

He concluded that:

- 1) The production of biofuels is very inefficient land use and the direct usage of biomass for heating or electricity conversion in power plants (replacing fossil fuels) is more efficient.
- 2) Solar energy can and will be used to generate electricity either via solar thermal power plants or photovoltaic cells.
- 3) The most efficient and green transportation in the future should be driven by the combination of photovoltaic cells, electric battery and electric engines.



The Nobel Laureate Hartmut Michel presented an inspiring public lecture in University Cultural Centre, National University of Singapore (NUS)