Bar-Ilan University
אוניברסיטת בר-אילן

Faculty of Exact Sciences | הפקולטה למדעים מדויקים
Department of Chemistry | המחלקה לכימיה

S E M I N A R

Wednesday 27/2/19, 11:00 am

Building 211, seminar room

SPEAKER:

Prof. Avner Rothschild

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TOPIC:

Solar Fuels: Science vs. Fiction

"We're issuing a challenge. We're telling America's scientists and engineers that if they assemble teams of the best minds in their fields and focus on the hardest problems in clean energy, we'll fund **the Apollo projects of our time**… At the California Institute of Technology, they're developing a way to turn sunlight and water into fuel for our cars." (Barack Obama, State of the Union address, 26.1.2011)

Producing fuel from renewable sources such as sunlight and water has inspired scientists and engineers for decades. Nature has been doing this for ages by photosynthesis, but at a rate too slow for our current needs. The question is whether we can do better to provide our soaring needs for fuel in a way that does not jeopardize our present lifestyle as well as future generations.

In this seminar I will share my own personal viewpoint on this matter, based on ten years of research on photoelectrochemical water splitting for hydrogen production. Despite the remarkable progress in material exploration and development as well as new device concepts, I remain skeptical as for the potential of this approach to compete with the readily available combination of photovoltaics and electrolysis. I will discuss some of the pressing challenges that stand in the way of photoelectrochemical water splitting to make the leap from basic research to a viable technology.

Despite being skeptical as for the technological prospects of this approach, I remain fascinated by the basic scientific questions that it provides so generously. In this front, I will share with you some recent steps in our journey to understand the charge carrier dynamics in non-conventional semiconductors such as iron oxide (hematite, α-Fe_2O_3), where correlated electron effects challenge the conventional semiconductor device physics that governs the way of thinking of photoelectrochemical solar cell materials and devices. Last but not least, I will share with you our new thoughts regarding the surface reaction mechanism and the possible role of co-catalysts to enhance the efficiency of semiconductor photoelectrodes for solar water splitting.