Where in the world will our energy come from? What would it take for the world to get away from fossil fuels and switch over to renewable energy? It takes more than willingness to buy a Prius or to have solar panels installed on your roof. If we want to use wind, solar thermal, solar electric, biomass, hydro-electric and geothermal energy, it will take a lot of planning and willingness on the part of governments and industry. It takes R&D investment, a favorable price per unit of energy to get anyone to produce alternative energy, and plenty of resources to create those energy sources. These and other hurdles—technical, political, and economic—that must be overcome before the widespread adoption of renewable energy technologies will be discussed.

We are developing an artificial photosynthetic system that will only utilize sunlight and water as the inputs and will produce hydrogen and oxygen as the outputs. We are taking a modular, parallel development approach in which the three distinct primary components—the photoanode, the photocathode, and the product-separating but ion-conducting membrane—are fabricated and optimized separately before assembly into a complete water-splitting system. The design principles incorporate two separate, photosensitive semiconductor/liquid junctions that will collectively generate the 1.7-1.9 V open circuit necessary to support both the oxidation of $\text{H}_2\text{O}$ (or $\text{OH}^-$) and the reduction of $\text{H}^+$ (or $\text{H}_2\text{O}$).

Nathan Lewis received his Ph.D. in 1981 from the Massachusetts Institute of Technology. He joined the California Institute of Technology in 1988 where he is the George L. Argyros Professor of Chemistry. He has also served as the Principal Investigator of the Beckman Institute Molecular Materials Resource Center.

Dr. Lewis has been an Alfred P. Sloan Fellow, a Camille and Henry Dreyfus Teacher-Scholar, and a Presidential Young Investigator. He received the Fresenius Award in 1990, the ACS Award in Pure Chemistry in 1991, the Orton Memorial Lecture award in 2003, the Princeton Environmental Award in 2003 and the Michael Faraday Medal of the Royal Society of Electrochemistry in 2008. He is currently the Editor-in-Chief of Energy & Environmental Science. He has published over 300 papers and has supervised approximately 60 graduate students and postdoctoral associates.

His research interests include artificial photosynthesis and electronic noses. Technical details of these research topics focus on light-induced electron transfer reactions, both at surfaces and in transition metal complexes, surface chemistry and photochemistry of semiconductor/liquid interfaces, novel uses of conducting organic polymers and polymer/conductor composites, and development of sensor arrays that use pattern recognition algorithms to identify odorants, mimicking the mammalian olfaction process.
The Department of Chemistry and Biochemistry at Arizona State University is pleased to announce the Eyring Lectures in Chemistry and Biochemistry for Fall 2009. This interdisciplinary distinguished lecturer series is dedicated to stimulating discussions by renowned scientists who are at the cutting edge of their respective fields. Each lecture series consists of a lead-off presentation to help communicate the excitement and challenge of this central science to the University and community, followed by a more specialized colloquium to help bring the audience to the scientific frontiers of the topics under discussion. Speakers will be scholars in residence in the Department during their lecture series and will be available for informal discussions with faculty, students, and other interested individuals.

The Eyring Lectures in Chemistry and Biochemistry bears the name of LeRoy Eyring, Regents' Professor of Chemistry, whose extraordinary instructional and research accomplishments and professional leadership at Arizona State University helped to bring the Department of Chemistry and Biochemistry into international prominence.

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