Department of Chemical and Environmental Engineering

2013—2014 Seminar Series

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WCH

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Oil-Water Separations Science and Technology for Oil Spill Cleanup And Environmental Remediation

Oil-water emulsions can be challenging to separate due to the complex interplay of water chemistry, oil chemistry and emulsion rheology. Over the years, we have explored an array of oil-water separation processes including: gravity separators, gas flotation, electrocoagulation, centrifugation, media filtration and membrane technology. These basic studies gave rise to some new approaches to oil-water separation, some of which were employed in the oil spill cleanup in the Gulf of Mexico in the summer of 2010, and which are now being applied to develop next generation solutions for produced water treatment. Produced water is the largest waste stream generated oil & gas exploration and production. In this talk, I will give a brief overview of our lab-scale oil-water separations research, how we got involved with the cleanup in the Gulf of Mexico, and what we are doing now, looking towards the future, to develop solutions for some of the most extreme water treatment problems facing the energy industry in the 21st century. The ultimate implications of our fundamental and applied research involve energy, security, water and environmental sustainability.

Short Biography: Dr. Eric M.V. Hoek is currently Professor and Director of the Industrial Affiliates Program in the UCLA Department Civil & Environmental Engineering (CEE). Dr. Hoek also holds faculty appointments in the UCLA California NanoSystems Institute and the UCLA Institute of Environment & Sustainability. At UCLA, Dr. Hoek's research primary research interest is membrane formation and application to water & wastewater treatment, desalination and water reuse, environmental remediation and renewable energy. In the past decade, Dr. Hoek has published over 80 peer-reviewed journal articles cited over 3,500 times in high-impact science and engineering journals such as Nature Materials, Nano Letters, Energy & Environmental Science, Langmuir, Journal of Membrane Science, and Environmental Science & Technology. Dr. Hoek is writing a textbook titled Aquatic Membrane Separations: Principles & Applications for John Wiley & Sons. In addition, Dr. Hoek has published 12 patents (awarded and pending), 7 book chapters, and presented his research over 220 times to industry, academia and governments on 5 continents.

Dr. Hoek also enjoys applying his basic research knowledge to practical applications having consulted for a range of private companies, municipalities, federal agencies, foundations and foreign governments. In his early career, Dr. Hoek developed approaches to make reverse osmosis (RO) desalination processes more cost effective, energy efficient, and environmentally friendly. The culmination of this decade long research program was the invention of thin film nanocomposite (TFN) RO membrane technology, which has since been commercialized by NanoH2O Inc. Dr. Hoek has received numerous awards for this TFN innovations and was featured in the New York Times, Forbes, and The Economist. Dr. Hoek was awarded the 2011 Walter L. Huber Award for "achievements in civil engineering research related to nanocomposite membrane technology" from the American Society of Civil Engineers. More recently, Dr. Hoek participated as a consultant in our nation's response to the BP Deepwater Horizon oil spill in the Gulf of Mexico and founded WaterPlanet Engineering, which is a new engineering firm focused on solutions for the world's most challenging desalination and water reuse problems.