Prof.dr. Han Gardeniers

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Biography

Han (J.G.E.) Gardeniers obtained a MSc degree in chemistry and a PhD in experimental solid state physics from Radboud University Nijmegen, The Netherlands, in 1985 and 1990, respectively. He was employed as and assistant professor (UD) in the field of Micromechanical Transducers at the University Twente, The Netherlands, from 1990 to 2001, after which he has worked in industry, as a senior scientist at Kymata Ltd./Alcatel Optronics and Micronit Microfluidics, from 2001 till 2003. He rejoined the University of Twente as associate professor (UHD) with the Biosensors/Lab-on-a-Chip Group in 2003. In 2007 he became full professor and started his own research group "Mesoscale Chemical Systems". This group focuses on micro and nanostructures for chemical applications, including microreactors and microfluidic systems for chemical analysis. His teaching activities are within the Chemical Engineering field. He received a personal NWO Vici grant in 2004 and an ERC Advanced Grant in 2017, and co-authored over 250 journal papers and 11 patents.

Abstract - Silicon-based photoelectrochemical solar-to-hydrogen devices

Silicon microwires show great promise for use in solar-to-fuel applications because of the earth-abundance and good light-harvesting properties of this material, while the microwire configuration ensures a large surface area for both light harvesting and electrochemical water splitting into hydrogen and oxygen. Several architectures will be discussed that tackle the challenges on the way to an efficient silicon-based hydrogen-producing device, in which light harvesting, catalytic conversion, and gas separation are integrated. One particular topic to be discussed is the fabrication of silicon pillars containing a 3D patterned catalyst on their surface. Also, several silicon membrane-based devices will be discussed that allow sufficient ionic transport between anode and cathode departments as well as effective gas separation between these same compartments.