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Affiliation	Tsinghua University, China	
<h2 style="color: red;">Invited Plenary Lecture</h2>		
Presentation Title	Membrane-free, Ir-free nano-fluidic pure water electrolysis—multiple effects of overlapping electric double layers	
Abstract (150 words)	<p>Wide spread installation of renewable energies will put a high premium on the capital cost reduction for water electrolysis, for which membrane-less electrolyzer offers a promising candidate. It is shown that membrane-less electrolyzer is capable of achieving high efficiency by reducing the anode-cathode distance from macro- into nano-scale, where the strong electric field within the overlapped electric double layers can enhance water splitting and generate H^+/OH^- ions in-situ. It is also shown that alkaline environment is generated near the anode, therefore the use of Ir can be avoided. However, the narrow distance between the anodes and cathodes also has a dark side: the crossover of the generated O_2 and H_2 to the counter electrodes where they are turned back into water. The commercialization of this nano-fluidic membrane-free water electrolysis hinges on the understanding, exploiting, and fighting with the multiple effects of the overlapping EDLs.</p>	
Biographical Sketch (150 words)	<p>Dr. Jianbo Zhang got his PhD degree on aerodynamics in the University of Tokyo, Japan. He worked in Nissan Research Center on the R&D of fuel cell and LIB during 2000~2011. He was offered the professorship in Tsinghua University, China in 2011.</p> <p>His research interests center around the diagnosis and design of electrochemical devices such as the fuel cell, lithium-ion cell, electrolyzer. The study on fuel cell includes the low Pt-loading and high power density MEA design, sub-zero start-up, etc. The study on lithium-ion cell includes the high power design of the electrodes and the cell, the quick charging from sub-zero, and the degradation diagnostics and prognostics, etc. He co-authored the book The Theory and Application of the Structure Design for Lithium-Ion Batteries (in Chinese), and two chapters, “Electrochemical impedance spectroscopy” and “Subzero startup of polymer electrolyte fuel cell”, in two books.</p>	