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Title: Harvesting the Blue Energy using Paper-based Microfluidics

Abstract: Sustainably harvesting energy for low-power electronics and sensor nodes benefits from several innovative approaches to progressively replace bulky electrochemical batteries, leading to more autonomous and fully portable devices. For instance, electromechanical, photovoltaics or electrochemical microgenerators have been developped, all with their own advantages and inconvenient. Meanwhile, the questions of durability and environmental footprint of these devices are getting more and more pregnant and receives naturally an increasing attention. In this work, we address a low-cost practical embodiment for harvesting the so-called blue energy, also known as osmotic power or salinity gradient, that results from the mixing of electrolytes with different salinity concentrations. The power harvesting results from a modified microfluidic paper-based electrochemical setting, we provide here a comprehensive analysis and the optimization of their performances.

Short Bio: Prof. Laurent A. Francis, received the M.S. and Ph.D. degrees from UCL in 2001 and 2006, respectively. His research interests are related to co-integrated, ultra-low power CMOS MEMS sensors for biomedical applications and environmental sensing. He was previously researcher at IMEC in Leuven, Belgium, in the field of acoustic and optical biosensors and piezoelectric RF-MEMS, and a visiting professor at Université de Sherbrooke, Canada. He is author or co-author of more than 150 scientific articles and holds five patents.