**Smart Nanomaterials Design for Economic and Truly Green Hydrogen - from Milligram to Kilogram**

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Almost every day, a new climate commitment is stated by a country, community, industry, or company that set the goal to become carbon neutral by 20xx. And while there are as many strategies as commitments communicated every day through the media, green electrolytic hydrogen produced by electrolysis has become the most discussed and supported plan to battle climate change. Yet looking at the electrolysis technologies, it becomes apparent that state-of-the-art electrolyzers do not allow low-cost hydrogen production and emit by needing to operate almost 24/7 with an electricity mix a whopping 29kg CO2eq per kg hydrogen produced. At CENmat, we understood this and went on a journey to reduce the cost of the electrolyzer to allow economical and truly green hydrogen production through re-designing the electrocatalyst at the nano level. In this talk, we take you behind the scenes and show you what challenges we faced at first in the re-design process and later in the up-scale and how we overcame those obstacles and are now on our way to change the electrolysis landscape.