



#InvestEUresearch

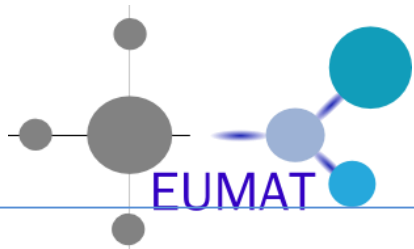
Horizon 2020 Work Programme for Research & Innovation 2018-2020

EMRS Event
Vienna, 29th October 2018

Workshop: Europe in Motion-EUMAT Session
Time: 14:00-18:00
Proponent: Ik4-TEKNIKER
Proposal title: NMBP29 Materials for PEM water electrolysis (PEMWE)

DG Research & Innovation

Research and
Innovation

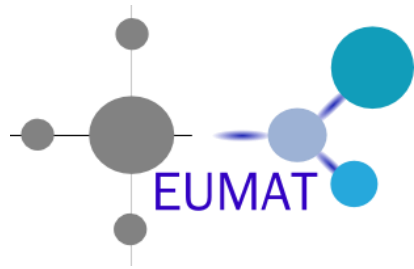


Organisation / Company profile

IK4-TEKNIKER is a private non-profit Research Centre (approximately 300 employees) for the metalworking, automotive, aeronautic and energy industry financed by contractual research and development activities. The final aim of every activity of IK4TEKNIKER is to increase competitiveness of industry by improving its technological level. IK4-TEKNIKER is member of the IK4 Research Alliance, one of the top 10 private R&D corporations in Europe with over 1.430 professionals, 23% of the staff are PhD holders, and an overall income exceeding 103 M€. IK4 has 152 patents in force and has set up a total of 71 new technology-based companies employing about 750 people.

The Physics of Surfaces and Materials Department of IK4-TEKNIKER involved in this project idea, has been working on PVD coatings for 20 years on the design and building of coating equipment and accessories, and the development and optimization of new coating materials and processes. IK4-TEKNIKER facilities include 7 physical vapour deposition equipment covering magnetron sputtering (DC, pulsed DC and RF), HIPIMS, e-beam, cathodic arc, e-beam, thermal evaporation and nanoparticle synthesis by sputtering.





Project Idea

TOPIC: NMBP_29 Materials for non-battery based energy storage (RIA)

Deadline 1st stage: 22 January 2019

TRL3 to TRL 5

4-6 Millions

Challenge

- Alternatives devices to batteries for energy storage fulfilling competitiveness, environmental aspects as well as economic viability.

Scope

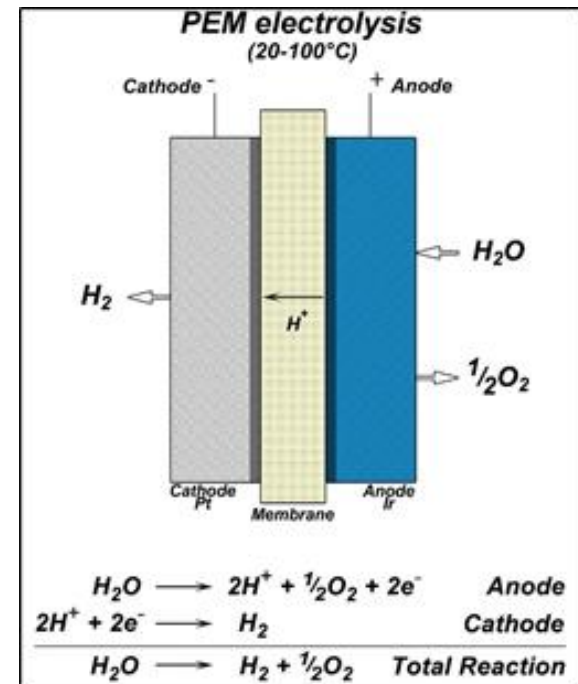
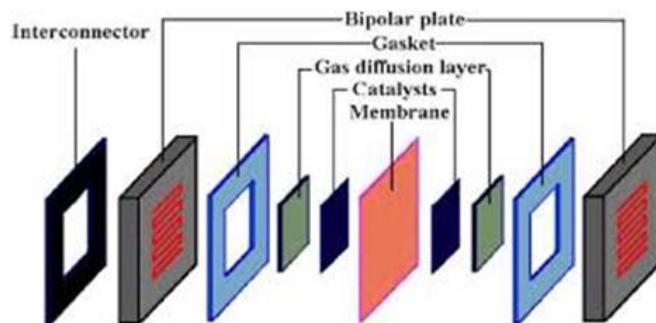
- **Advanced materials solutions for the development of durable and cost-effective proton exchange membrane water electrolyzers (PEMWE) for hydrogen production**
- Material manufacturing technologies ready for industrial deployment
- Sustainable materials

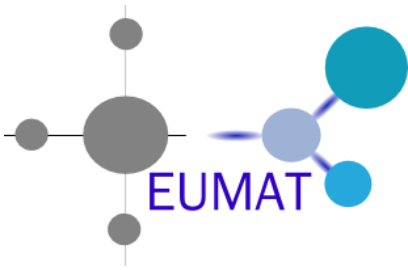
Project Idea

Materials for PEM water electrolyzers (PEMWE)

New and/or improved materials for PEMWE with increased performance, durability and reduced total costs including innovation in different PEMWE components

- **Bipolar plates (BPP) and current collectors**
- Catalyst layer
- Membranes
- Sealing gaskets



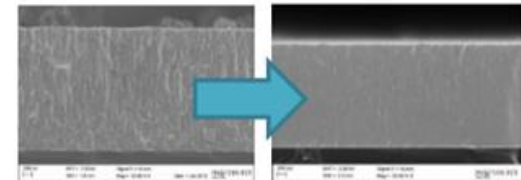


Tekniker's main expertise

Development of protective coatings by HiPIMS technology to substitute titanium by stainless steel for BPP and current collectors.

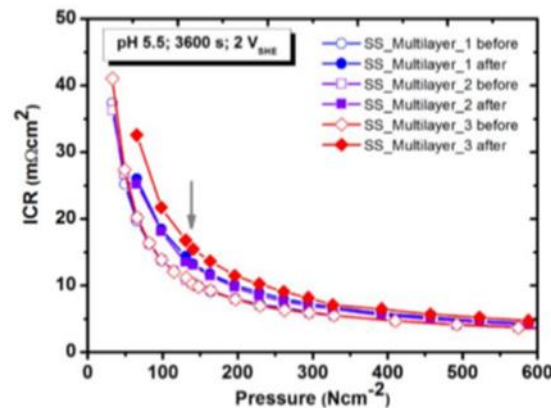
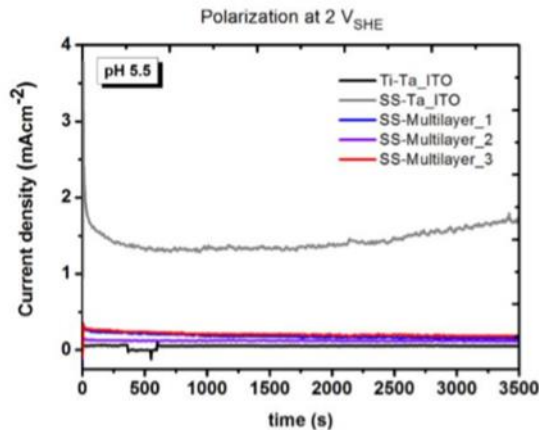
High Power Impulsed Magnetron Sputtering (HiPIMS) technology for the development of extremely dense and defect-free highly corrosion resistant and conductive coatings

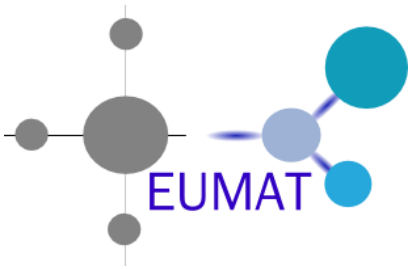
- Reduce corrosion and ICR
- Increase durability and reduce BPP cost



Sputtering

HiPIMS

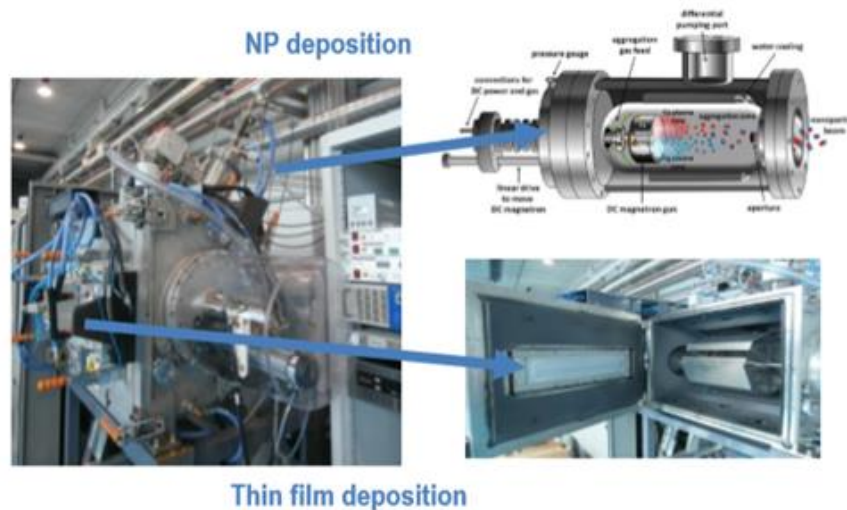


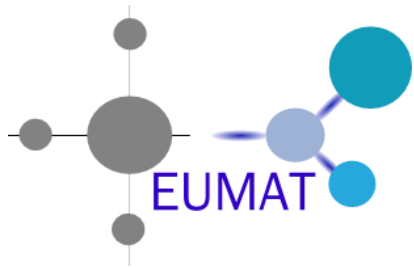


Tekniker's expertise

Development of catalyst layers by magnetron sputtering technology in both nanoparticle and thin film shape.

- Reduce catalyst loading
- Control of the size, shape, composition and purity of NP
- NP manufacturing and deposition by a clean and totally automated one step process.

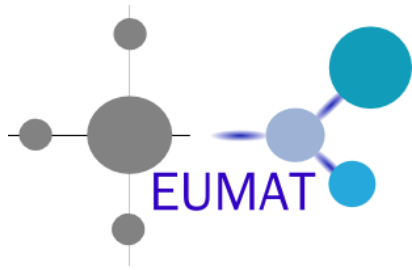




Expected impact

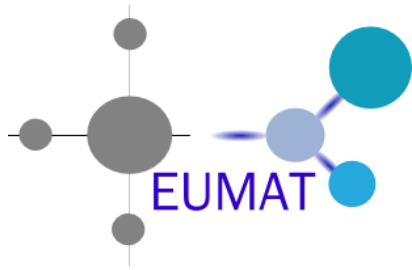
New and competitive PEM water electrolysers with higher durability and reduced total costs

- Durability > 100.000 h with very low efficiency degradation < 2%
- Investment cost < 1000 €/kW



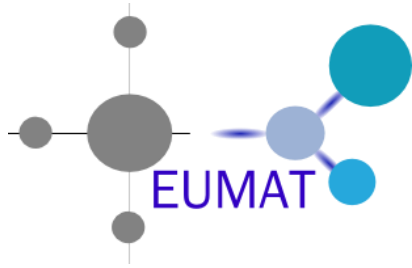
Existing project consortium

- **New coating materials for BPP** and new **catalyst layer** (IK4-Tekniker)
- **SS manufacturer** (already contacted)
- **Coating company** for upscaling (already identified)
- **PEMWE manufacturer** (already contacted)



Looking for partners

- Institute with high expertise in PEMWE
- Developer of membranes
- Developer of sealing gaskets



Contact details

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