Brazilian scientists obtain a material that could be useful for hydrogen production

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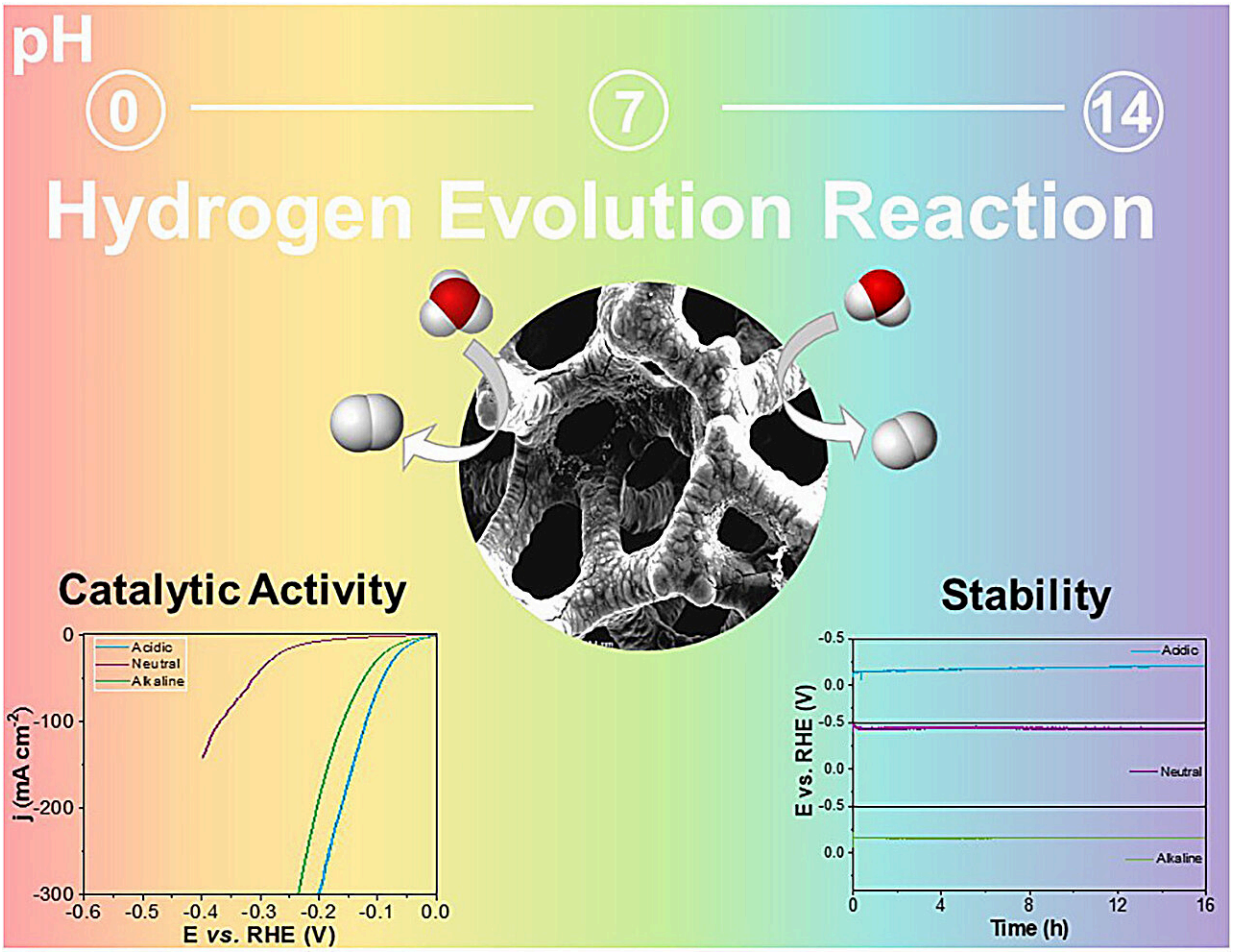

Graphical abstract. Credit: *Electrochimica Acta* (2023). DOI: 10.1016/j.electacta.2023.143679

Hydrogen (H_2) is considered a possible alternative to fossil fuels, which are responsible for a large proportion of atmospheric emissions and global warming, but production costs must be lowered if it is to become a viable option.

In an article published in the journal *Electrochimica Acta*, scientists at the Center for Development of Functional Materials (CDMF), a Research, Innovation and Dissemination Center (RIDC) hosted at the Federal University of São Carlos (UFSCar) in São Paulo state, Brazil, describe the synthesis of a nickel phosphide electrode that showed high efficiency in hydrogen evolution reaction (HER) electrocatalysis.

This type of reaction, which is still costly, breaks down water molecules to release hydrogen ions in a process known as hydrolysis.

Electrochemical production of hydrogen by hydrolysis is a promising technique with zero carbon emissions. Its efficiency depends on the capacity of the electrocatalyst.

In the article, the researchers describe an experiment designed to analyze the performance of amorphous nickel phosphide (Ni-P) electrodes synthesized via electrodeposition on Ni foam used as an HER electrocatalyst. The 3-Ni-P electrode performed outstandingly in alkaline, neutral, and acidic conditions. The Ni-P films showed excellent stability under the different conditions studied.

The electrode's strong performance was attributed to its granular structure, with a large surface area enabling good interaction with the electrolyte and endorsing HER kinetics. According to the authors, the results are relevant to the search for a catalyst that is stable, easy to synthesize, and capable of operating in a wide range of pH with high efficiency for the production of hydrogen from water.

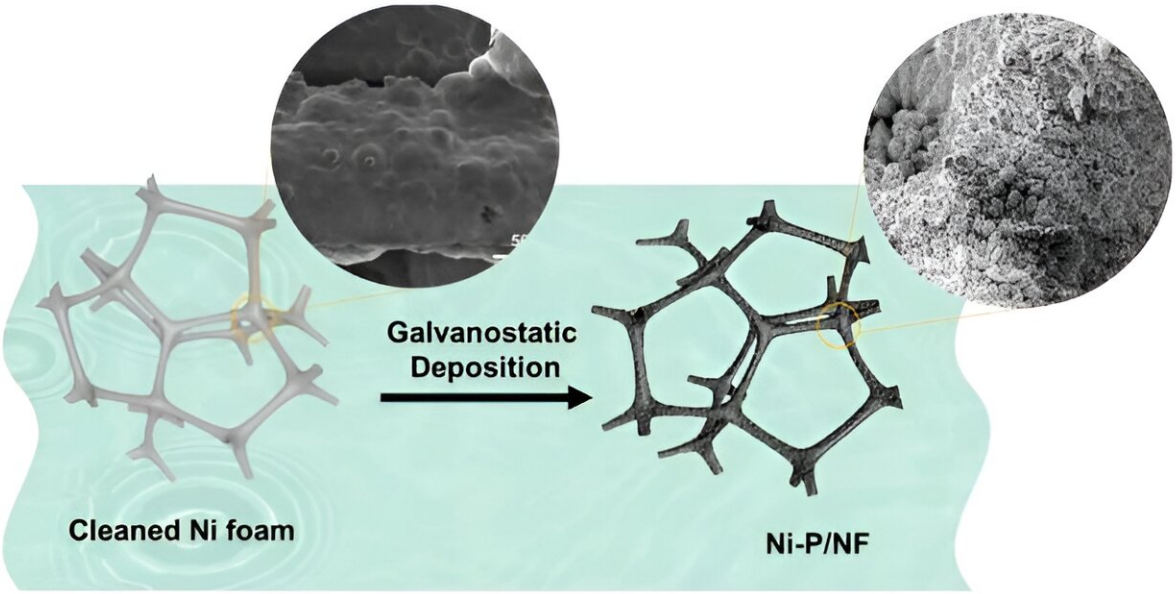

Fig. 1. Schematic illustration of the Ni-P/NF electrode synthesis.

The researchers set out to analyze the performance of amorphous nickel phosphide (Ni-P) electrodes synthesized via electrodeposition on nickel foam. Credit: CDMF

More information: A.B. Silva et al, One-step electrodeposited nickel phosphide electrode for pH-universal electrochemical hydrogen production, *Electrochimica Acta* (2023). DOI: 10.1016/j.electacta.2023.143679

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