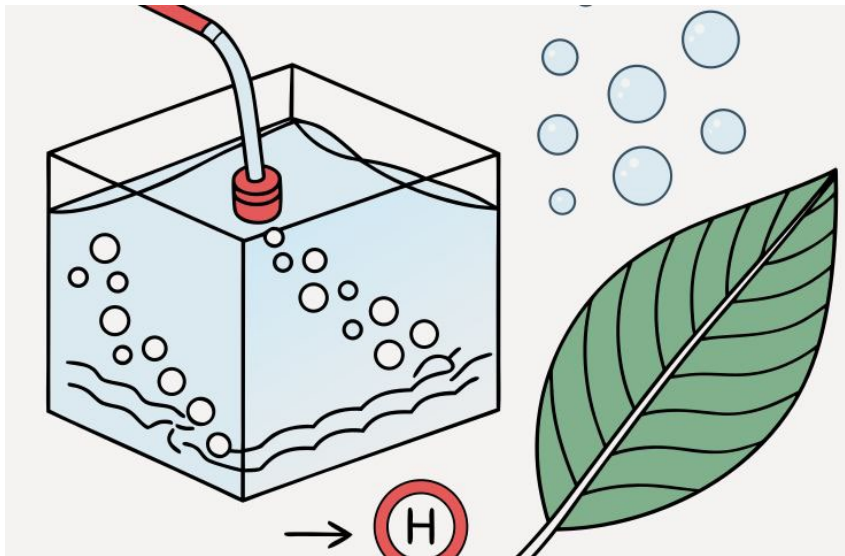


28 September 2026

NTU artificial leaf advances green hydrogen production from seawater while tackling hydrazine contamination

This innovative device utilizes solar energy to drive a dual-purpose chemical reaction for energy production and water purification. The system operates without external electricity, offering a sustainable pathway for green hydrogen generation.



A Dual-Action Solar Innovation

Scientists at Nanyang Technological University (NTU) in Singapore have developed a self-powered artificial leaf designed to address two environmental challenges simultaneously[1][2]. The device utilizes photoelectrochemical technology to harness sunlight, converting the electrolytes present in seawater into green hydrogen gas[1][2].

Unlike traditional electrolysis methods that require significant external electrical input, this system is entirely solar-driven[1]. The mechanism relies on a specialized module that facilitates a chemical reaction, allowing for the decentralized production of clean fuel directly from oceanic sources[2].

Technical Composition and Mechanism

The architecture of the artificial leaf integrates a lead-halide perovskite photocathode paired with an iron-cobalt-chromium oxide catalyst[1]. When exposed to sunlight, the perovskite material generates high-energy electrons that migrate to the interface between the cathode and the electrolyte[1].

This electronic movement triggers the conversion of water molecules into hydrogen gas[1]. Simultaneously, the system manages "holes" created during the photo-excitation process, which are leveraged to break down hydrazine, a highly toxic industrial chemical often found as a contaminant in water systems[1][2].

Implications for Green Energy and Ecology

By combining hydrogen production with wastewater treatment, this technology optimizes the efficiency of solar energy utilization[2]. The ability to neutralize hydrazine while producing fuel makes it a versatile tool for industrial decontamination and sustainable energy harvesting[1][2].

For regions with vast coastlines and high solar irradiation, such as Morocco, this research highlights a potential shift toward integrating pollutant remediation with the scaling of the green hydrogen economy[1][2]. The integration of catalyst-enhanced perovskites represents a significant step in reducing the costs associated with purifying seawater for fuel production[2].

1NTU artificial leaf advances green hydrogen production from seawater while tackling hydrazine contamination — <https://www.hydrogenfuelnews.com/ntu-artificial-leaf-advances-green-hydrogen-production-from-seawater-while-tackl/8576735/>

2Perovskite-based device generates H₂ and removes pollutants — https://compoundsemiconductor.net/article/125352/Perovskite-based_device_generates_H%E2%82%82_and_removes_pollutants

3Signalement d'origine : Hydrogen Fuel News (EN) — <http://hydrogenfuelnews.com/ntu-artificial-leaf-advances-green-hydrogen-production-from-seawater-while-tackl/8576735/>

<https://www.globeactus.com/en/story/ntu-artificial-leaf-advances-green-hydrogen-production-from-seawater-while-tackling-hydrazine-contamination>