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March 2026

Path to Sustainability

Harnessing Hydrogen

Recent developments

Curated and summarized - Industry and Patent news

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Preface

There is a major transformation taking place in the global energy landscape as countries try to reduce carbon emissions and mitigate the impact of climate change. Hydrogen, a clean and versatile energy carrier, is emerging as a promising solution for a sustainable future. Its applications are diverse, ranging from powering vehicles and generating electricity to fueling industrial processes. The hydrogen ecosystem is rapidly evolving, with innovations emerging across the entire value chain.

This monthly report is focused on **"Hydrogen as a fuel"** including applications in transportation, manufacturing industries and energy sector. This report is a free resource for anyone working in this domain including technologists, innovators, Intellectual Property (IP) managers, strategy makers, environmental enthusiasts, etc. The report contains curated insights and summaries of the latest news and key patents published in the last one month, including the latest products, business updates, collaborations, new innovations, and more.

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Key Insights this month

- The partnership between Baker Hughes and Vallourec indicates growing momentum for integrated hydrogen storage and compression systems that lower infrastructure costs and speed up deployment. By boosting efficiency and ensuring stable hydrogen availability, it increases the commercial readiness of large-scale hydrogen projects across heavy industry and power sectors.

- GenH2's CS900 platform reduces technical risk in liquid-hydrogen projects by delivering real-world data that strengthens the design and reliability of LH_2 storage and transfer systems. This higher level of validation boosts investor confidence and accelerates scalable LH_2 adoption across mobility, industrial, and energy applications.

- Hydrogen logistics take an important step forward with China's first Type 4 MEGC (Multi-Element Gas Container), where lightweight composite cylinders and higher storage capacity significantly cut transport costs per kilogram. By meeting global safety standards and offering modular configurations, this technology strengthens the supply chain and accelerates scalable, cost-efficient hydrogen distribution for industrial and mobility markets.

- Elcogen's partnership with JNK India marks a meaningful expansion of solid oxide technology into India's hard-to-abate sectors, creating new pathways for industrial decarbonization. By advancing hybrid alkaline - solid oxide concepts and waste-heat recovery solutions, the collaboration positions India as a strategic hub for next-generation, cost-efficient green hydrogen and Power-to-X systems.

- Many inventions published last month revolved around these themes:

  - Key innovations include real-time, sensor-based fuel optimization and location-specific control of hydrogen production and usage to maintain safety.

  - Improvements in fuel cell components include a dual-layer PTL (porous transport layer) and a more efficient method for producing CCMs (Catalyst-coated membranes) without the older decal process.

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Industry News

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Industry News

Power2X Expansion

Power2X acquires hydrogen developer HyCC to accelerate clean molecule delivery in NL and NW Europe

Power2X has acquired Dutch green-hydrogen developer HyCC to strengthen its leadership in clean-molecule projects and industrial decarbonization across the Netherlands, Germany and Northwest Europe. The deal creates greater scale and efficiencies as the clean-molecules sector shifts from early project development to large-scale delivery, integrating HyCC's portfolio in key hubs such as Amsterdam, Delfzijl and Rotterdam into Power2X's broader capabilities and capital base. Clean molecules including green hydrogen are seen as critical for Europe's industrial competitiveness and energy security, and the combined portfolio could unlock significant future investment. HyCC's technical expertise will accelerate project development within Power2X, while the acquisition supports ecosystem consolidation, de-risks investments, and enhances Europe's resilience and decarbonization leadership.

Source: Power2X

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Industry News

H_2 Storage Collaboration

Baker Hughes and Vallourec sign a memorandum of Understanding on underground hydrogen storage With the Delphy solution

Vallourec has signed a Memorandum of Understanding (MOU) with Baker Hughes to advance next-generation hydrogen storage solutions for the green hydrogen market. The partnership integrates Vallourec's certified Delphy underground hydrogen-storage system with Baker Hughes' compression technologies to optimize storage–compression setups, improve operating pressures, and reduce total cost of ownership. The collaboration targets applications across the green hydrogen value chain, including green ammonia, sustainable fuels, green steel, and clean-power sectors such as data centers, ultimately strengthening Vallourec's position as a key player in large-scale hydrogen storage and enabling more competitive hydrogen infrastructure development. This combined approach strengthens project efficiency and supports larger-scale deployment across the green hydrogen value chain.

Source: Vallourec

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Industry News

Solid Oxide Partnership

Elcogen signs MoU with JNK India Limited to explore solid oxide technology collaboration in India

Elcogen is expanding its India presence through an MoU with JNK India Limited to explore collaboration in solid oxide technology, marking Elcogen's first partnership with an Indian EPC company and supporting its broader expansion into India and the APAC region. The MoU follows strong engagement at India Energy Week 2026 and the appointment of Anil Srikar Pavuluri as Business Development Director for India and APAC. Under the agreement, the two companies will evaluate technical and commercial opportunities to apply Elcogen's solid oxide stacks and modules in waste-heat recovery systems across hard-to-abate sectors such as green ammonia, green urea, e-fuels, and Power-to-X. They will also explore hybrid concepts that combine alkaline and solid oxide technologies as a pathway to more cost-effective green hydrogen production.

Source: Elcogen

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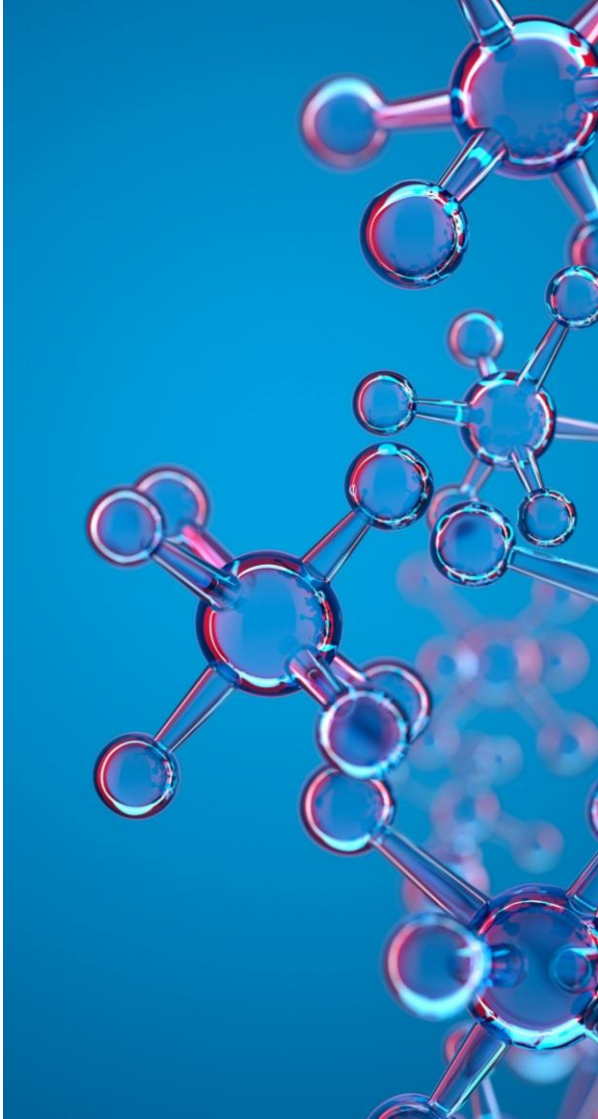
Industry News

Liquid H2 Advancement

GenH$_2$ completes major milestone: commissioning liquid hydrogen simulation test platform

GenH2 Corp has commissioned and validated its Cryostat CS900 Liquid Hydrogen (LH_2) Simulation Test Platform, marking a major milestone in advancing zero-loss liquid-hydrogen infrastructure. The CS900 integrates liquefaction, controlled storage and transfer in one environment, generating real-world performance data for LH_2 materials and systems. Based on cryogenic technology pioneered at NASA, the platform replicates actual operating conditions to evaluate thermal behavior, storage stability and hydrogen transfer. Insights from the CS900 directly support the design of GenH2's liquefaction, controlled-storage and zero-loss transfer products, while also contributing to industry projects with partners such as Shell. The platform enables comprehensive testing from liquefaction and tank performance to sensing and system-safety validation, laying the foundation for scalable liquid-hydrogen infrastructure.

Source: GenH2



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Next-Gen Hydrogen Transport

CIMC-Hexagon achieves a milestone in domestic high-pressure hydrogen storage and transport

CIMC-Hexagon Hydrogen Energy Development has launched China's first 20-foot Type 4 hydrogen Multi-Element Gas Container (MEGC), marking a major milestone in domestic high-pressure hydrogen storage and transport technology. The new MEGC uses lightweight composite Type 4 cylinders, stores over one ton of hydrogen at 38 MPa, and meets international standards such as ADR (European Agreement concerning the International Carriage of Dangerous Goods by Road) 6.8 and TPED (Transportable Pressure Equipment Directive), enabling safe, efficient transport by road, rail and inland waterways. Its modular 10–45 ft configurations, reduced weight and higher capacity significantly lower logistics costs and improve cost per kilogram of hydrogen transported. Leveraging Hexagon Purus's global expertise and CIMC ENRIC's full-chain manufacturing capability, the product delivers world-class performance and reliability.

Source: CIMC-Hexagon

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The editor's shortlist

Patents of the month

Patents of the month

Published in Feb 2026

Shortlisted and summarized by our analyst

- US2026056019A1 - Computer-based determination of types of fuel to use along a route
  Assignee: IBM CORP (US)
- US2026034976A1 - Systems and methods for control of hydrogen systems
  Assignee: Cummins Inc (US)
- US2026049695A1 - Hydrogen catalyst for vehicle cooling Green
  Assignee: Daimler Trucks North America LLC (US)
- EP4689233A1 - Electrochemical cell stack Green
  Assignee: Bekaert NV SA (Belgium)
- EP4690326A1 - Method for manufacturing a catalyst-coated Green membrane
  Assignee: Johnson Matthey Hydrogen Technologies Ltd (UK)
- EP4686772A1 – Balance-of-plant for electro-synthetic or electro-energy liquid-gas cells or cell stacks Green
  Assignee: Techlam SA, Totalenergies Onetech (France)
- KR20260016734A - Cryogenic media double vacuum tank
  Assignee: Samsung Heavy Industry Co Ltd (Korea)
- CN223956576U - Hydrogen fuel cell power system applied to two-wheel vehicle
  Assignee: Foshan Panye Hydrogen Energy Technology Co Ltd (China)
- IN202421063658A - Hydrogen fueled internal combustion engine
  Assignee: Tata Motors Ltd (India)
- IN202521131475A - Modular cylindrical hydrogen fuel cell system with integrated gas management
  Assignee: MIT Art Design & Technology Univ Pune (India)

Patents summarized with the help of Octi AI powered by Octimine

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Latest patents

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US2026056019A1

Computer-based determination of types of fuel to use along a route

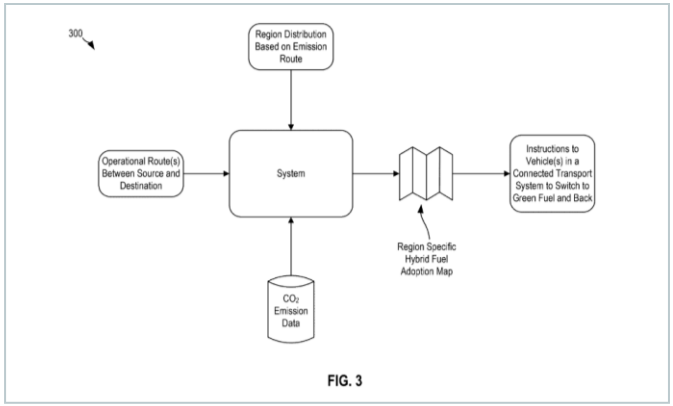

FIG. 3

Company name	IBM Corp (US)
Inventors	Roy Rahul, Sood Siddhartha, Sarkar Jaydeep, Koley Krishna, Jain Abhishek, Bhadra Debasis, Ghosh Brati Sankar
Priority date	19-Oct-2023
Publication date	13-Jan-2026

This invention provides a way to decide which types of fuel a vehicle should use along different parts of a journey. It calculates a route from the starting point to the destination, divides it into smaller segments, and selects at least two types of fuel such as gasoline, electricity, natural gas, or other alternatives for the vehicle to use in each segment. These assignments are optimized based on environmental factors including regional carbon-emission levels, fuel availability, ecological sensitivities, regulations, traffic, weather, and cost. It also updates hybrid-fuel adoption maps using real-time sensor data, compares routes based on carbon output, and selects paths that minimize emissions, enabling more sustainable and adaptive fuel management across diverse transport networks.

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Latest patents

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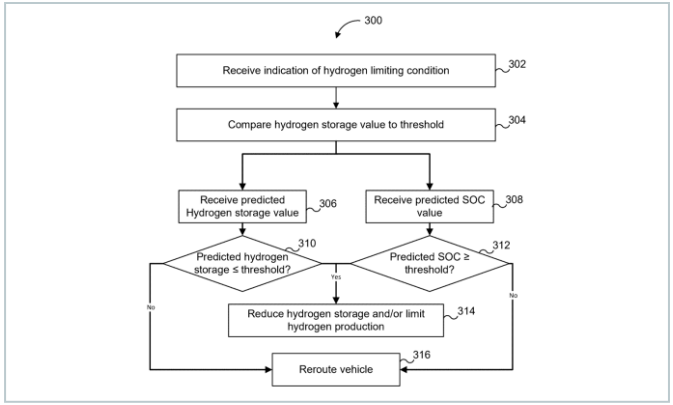

US2026034976A1

Systems and methods for control of hydrogen systems

Company name	Cummins Inc (US)
Inventors	Light Holets Jennifer Kay, Beinborn Aaron William
Priority date	24-Jul-2025
Publication date	05-Feb-2026

The patent provides a smart control system for hydrogen-powered vehicles that manages how much hydrogen is stored, produced, and used based on location-specific limits and safety conditions. When the vehicle approaches areas where hydrogen levels must be reduced, the controller checks current hydrogen storage and predicted battery charge to decide whether the engine should use more hydrogen before entering the zone. It also controls when the onboard hydrogen production system should operate and adjusts power flow in hybrid setups to stay within regulations. If the vehicle cannot meet local limits with its current hydrogen and energy levels, it can suggest an alternate route. Overall, the invention improves safety, efficiency, and regulatory compliance by coordinating hydrogen consumption, production, and routing decisions.

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Latest patents

US2026049695A1 Green

Hydrogen catalyst for vehicle cooling

Company name	Daimler Trucks North America LLC (US)
Inventors	Slusser Kevin, Barra Zachary Joseph
Priority date	15-Aug-2024
Publication date	19-Feb-2026

Summarized by Dennemeyer

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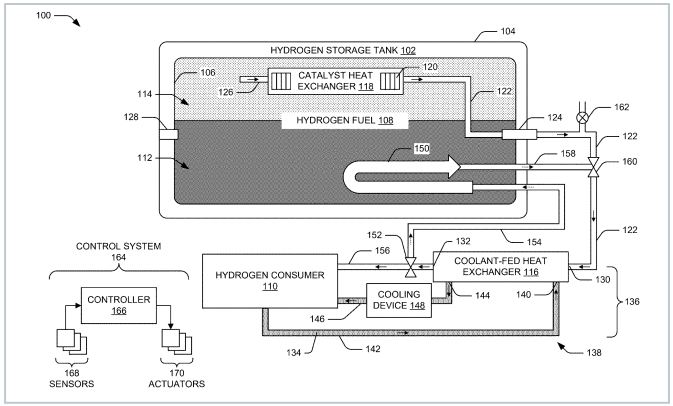

This invention improves cooling in hydrogen-powered vehicles by placing a hydrogen catalyst in the flow path between the hydrogen tank and the engine or fuel cell. The catalyst triggers a reaction that converts hydrogen from a low-energy form (para-hydrogen) to a higher-energy form (ortho-hydrogen), a process that naturally absorbs heat. This endothermic reaction helps cool the hydrogen fuel before it reaches the consumer, while the absorbed heat is taken from the coolant through a heat exchanger upstream of the engine or fuel cell. The system can also stabilize tank pressure by routing warmed hydrogen back into in-tank heat exchangers when needed. A control unit manages valves and flow paths to maintain optimal temperatures and preserve stored hydrogen without relying on large radiators or electrical heaters.

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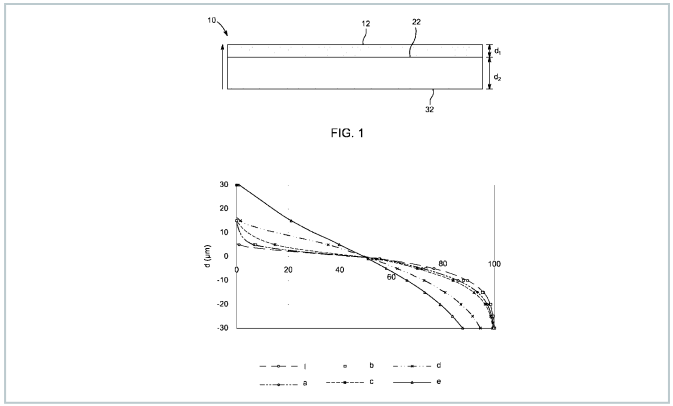
EP4689233A1 Green

Electrochemical cell stack



Company name	Bekaert NV SA (Belgium)
Inventors	Favet Thomas, Synhaeve Kris, Hellert Dieter, Simonart Alain
Priority date	31-Mar-2023
Publication date	11-Feb-2026

This invention introduces an improved porous transport layer (PTL) for PEM electrolysers and fuel cells by combining two different metal fiber layers into one structure. The layer touching the membrane is made of finer, smoother fibers with smaller pores, so it protects the membrane and makes good electrical contact with the catalyst. The second layer is made of thicker fibers with larger pores, which helps gases and liquids flow more easily. These two layers are compressed and then fused together in a single sintering step, making the PTL strong, stable, and cheaper to manufacture compared to multi-step processes. The dual-porosity design improves gas and water movement, lowers electrical resistance, and allows better performance even with less catalyst, making the overall system more efficient and cost-effective.

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Latest patents

EP4690326A1 Green

Method for manufacturing a catalyst-coated membrane

Company name	Johnson Matthey Hydrogen Technologies Ltd (UK)
Inventors	Coole Jake, Howells Jake Benjamin, O Sullivan Julie, Turner Wayne
Priority date	31-Mar-2023
Publication date	11-Feb-2026

Summarized by Dennemeyer

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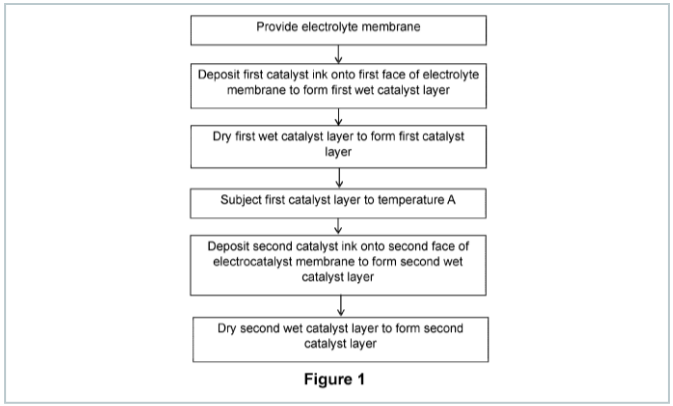

Figure 1

This invention provides a better way to make catalyst-coated membranes (CCMs) for fuel cells and electrolysers. Instead of using the older decal method, which involves many steps and can damage the membrane, this method applies the catalyst ink directly onto both sides of the membrane. First, one side of the membrane is coated, dried, and then heated at a high temperature to make the layer strong and stable. Then, the other side is coated and dried at a lower temperature. This prevents the membrane from swelling, reduces defects, and removes the need for hot pressing. The process works well with roll-to-roll manufacturing, making it easier to produce large quantities. Overall, it creates smoother, more reliable catalyst layers and improves the performance of the final device.

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EP4686772A1 Green

Balance-of-plant for electro-synthetic or electro-energy liquid-gas cells or cell stacks

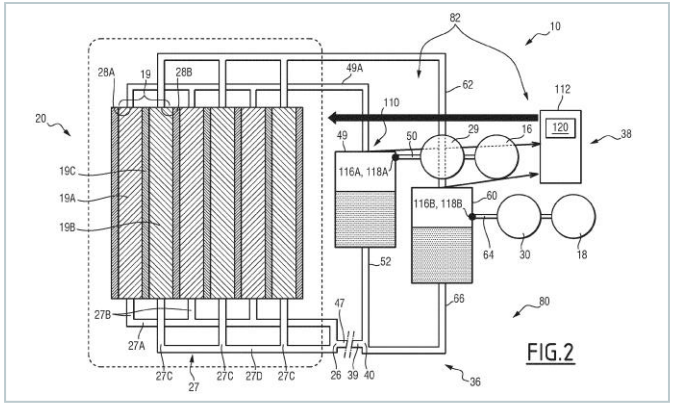

FIG.2

Company name	Techlam SA, Totalenergies Onetech (France)
Inventors	Ayme Perrot David, Gabrielle Brice, Guillotin Mathieu
Priority date	02-Aug-2024
Publication date	04-Feb-2026

This invention protects the metal parts inside alkaline water electrolysis systems from corrosion. Normally, strong alkaline liquids like potassium hydroxide react with metal equipment, causing rust, sludge, and particles that clog the system and reduce performance. To solve this, the invention adds two protective layers on the inside surface of the metal parts: a thin adhesive polymer layer that sticks to the metal, and a thicker polymer liner that directly faces the electrolyte and stops it from touching the metal. This layered structure prevents corrosion, keeps the electrolyte clean, and allows the use of cheaper metals like carbon steel instead of expensive stainless steel. It also provides electrical insulation and long-lasting protection even under high pressure or fluctuating renewable power. Overall, the system becomes more durable, reliable, and cost-effective.

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KR20260016734A

Cryogenic media double vacuum tank

Company name	Samsung Heavy Industry Co Ltd (Korea)
Inventors	Park Tae-yoon, Son Moon-ho, Jeon Sang-ik, Cho Tae-min,
Priority date	26-Jul-2024
Publication date	04-Feb-2026

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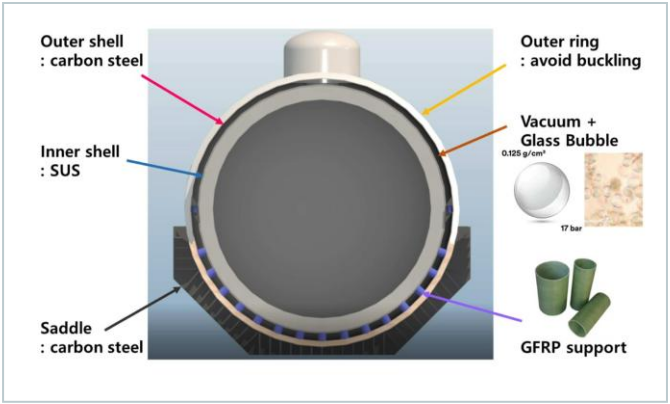

This invention introduces a more effective way to store extremely cold liquids like liquid hydrogen, LNG, and liquid helium by reducing how quickly they evaporate. Traditional insulation needs to be very thick, and even double-vacuum tanks still allow some heat to enter because the outer tank stays warm. To solve this, the invention adds a cooling coil around the outer tank that circulates a cold refrigerant. This actively cools the outer tank itself, which lowers the temperature and pressure in the vacuum space between the two tanks. As a result, much less heat reaches the inner tank, and the cryogenic liquid stays cold with minimal vaporization. The system also includes features like spiral grooves to hold the coil, extra insulation, and a cooling or vacuum unit to keep conditions stable. Overall, it provides more efficient storage without needing overly thick insulation materials.

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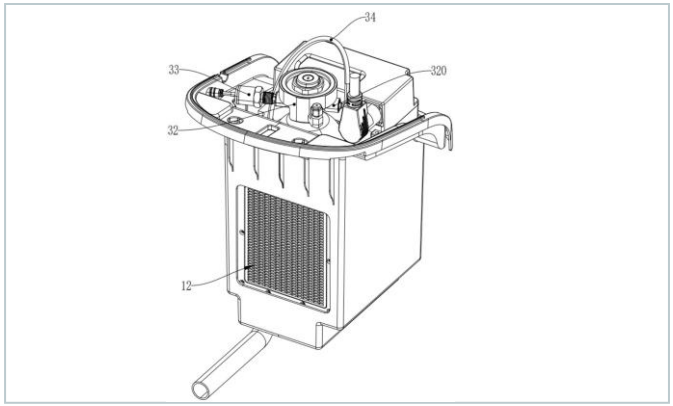
CN223956576U

Hydrogen fuel cell power system applied to two-wheel vehicle



Company name	Foshan Panye Hydrogen Energy Technology Co Ltd (China)
Inventors	Lu Jianwen, Dong Hui
Priority date	16-Jan-2025
Publication date	27-Feb-2026

This invention makes installing a hydrogen fuel cell power pack in two-wheeler vehicles safer, faster, and more reliable. In current systems, the cabin often presses against the hydrogen and water discharge hoses during installation, which can bend or deform the hoses and create leakage risks. To solve this, the invention introduces an automatic plug-in connection system: the cabin has a built-in connector at the bottom, and the power pack has a matching connector. When the power pack is placed inside the cabin, the two connectors automatically attach to each other without any manual effort. his eliminates the need for workers to connect hoses beforehand, preventing mistakes and saving time. It also ensures a secure and consistent connection every time, improving the overall durability and safety of the hydrogen discharge process.

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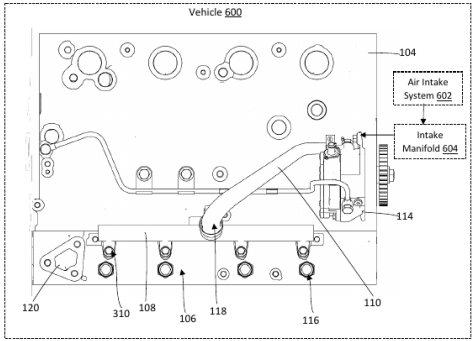
IN202421063658A

Hydrogen fueled internal combustion engine



Company name	Tata Motors Ltd (India)
Inventors	Inkar Majumder, Amit Satre, Himanshu Pathani, Lalit Katkar, Shrikant Jahagirdar
Priority date	23-Aug-2024
Publication date	27-Feb-2026

The patent presents a solar-powered photoelectrochemical (PEC) method for producing high-purity hydrogen by splitting water using advanced semiconductor photoelectrodes, catalytic coatings, and ion-selective membranes. These materials are shaped into tiny structures that catch more light and help move charges more efficiently, making the hydrogen-producing reaction faster. Co-catalysts are added to the surface to speed up hydrogen generation, and a special membrane keeps the hydrogen and oxygen separate so the hydrogen stays more than 99.9% pure. The system also uses a carefully chosen electrolyte and protective layers to prevent damage to the materials, helping the device last longer. Overall, the invention creates high-purity hydrogen using only sunlight, with no carbon emissions and extra electrical power.

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IN202521131475A

Modular cylindrical hydrogen fuel cell system with integrated gas management

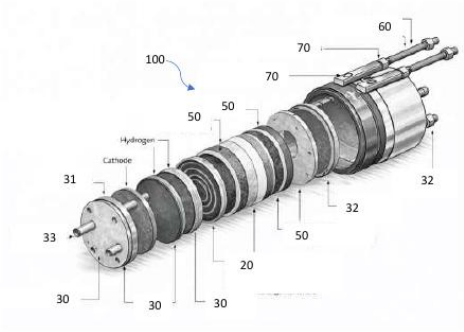
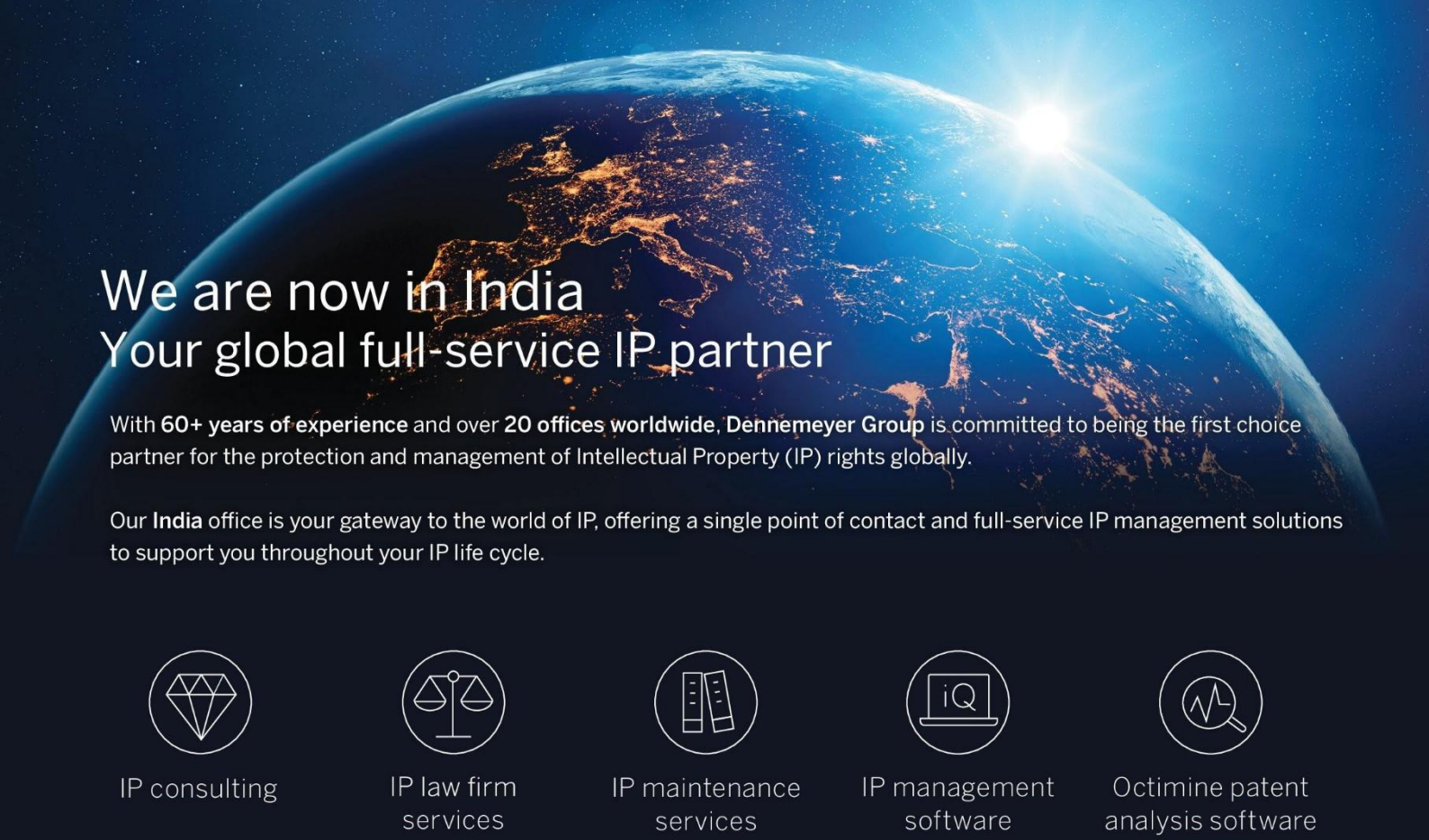


Figure. 2

Company name	MIT Art Design & Technology Univ Pune (India)
Inventors	Dr Ganesh Rajaram Pathak, Yash Garg, Aditya Tukaram Sapate
Priority date	24-Dec-2025
Publication date	13-Feb-2026

This invention introduces a new type of hydrogen fuel cell that uses a cylindrical shape with spiral or helical gas channels instead of the traditional flat, planar design. These curved pathways help spread hydrogen and air evenly across the cell, remove water naturally through centrifugal force, and keep the temperature balanced without needing extra cooling or humidification equipment. The cylindrical design also allows the fuel cell to be more compact and powerful, making it suitable for vehicles, drones, aerospace systems, marine use, and portable power devices. By improving gas flow, water management, and heat control, the invention increases durability, reduces maintenance needs, and offers a simpler, more efficient fuel cell system that can be scaled for many applications.



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