

Figure S2. Word cluster (2/7) formed by 147 items extracted the titles and abstracts of 148,056 searches on “hydrogen” as keyword carried out from 2010 to 2022.

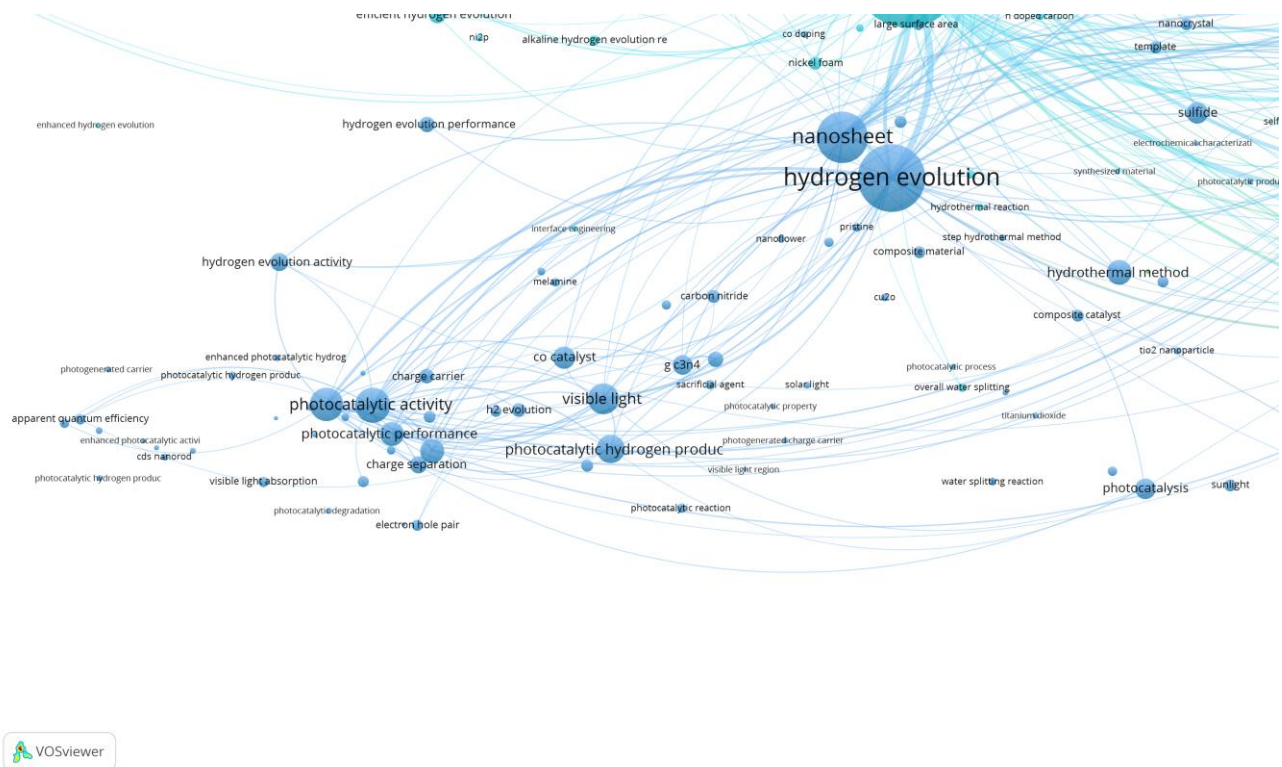


Figure S3. Word cluster (3/7) formed by 118 items extracted from titles and abstract of 148,056 searches on “hydrogen” carried out from 2010 to 2022.

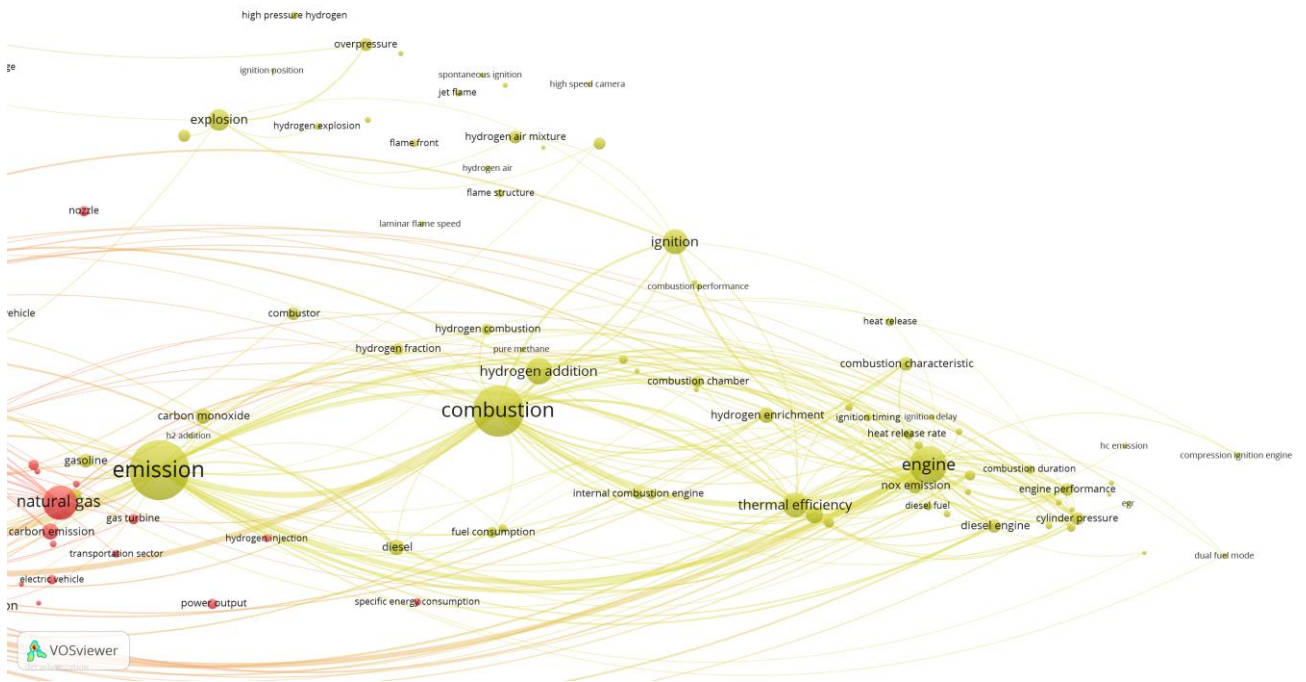


Figure S4. Word cluster (4/7) formed by 84 items extracted from titles and abstract of 148,056 searches on “hydrogen” carried out from 2010 to 2022.

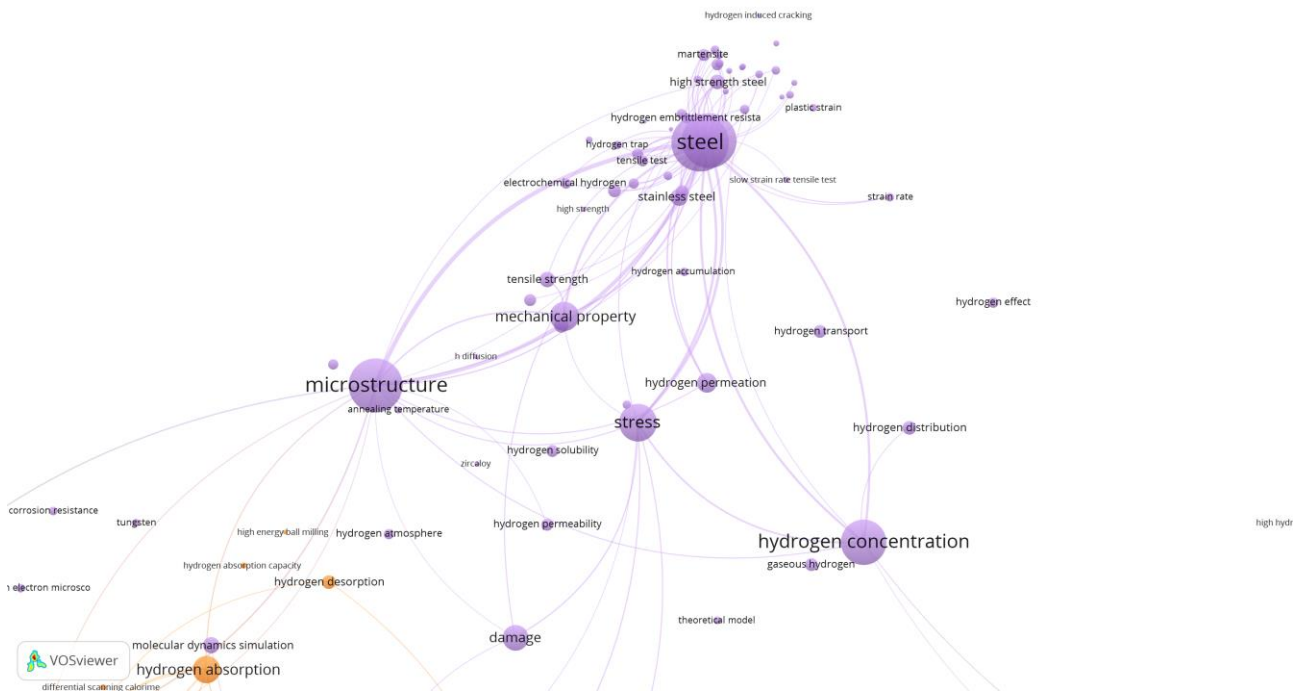


Figure S5. Word cluster (5/7) formed by 82 items extracted from titles and abstract of 148,056 searches on “hydrogen” carried out from 2010 to 2022.

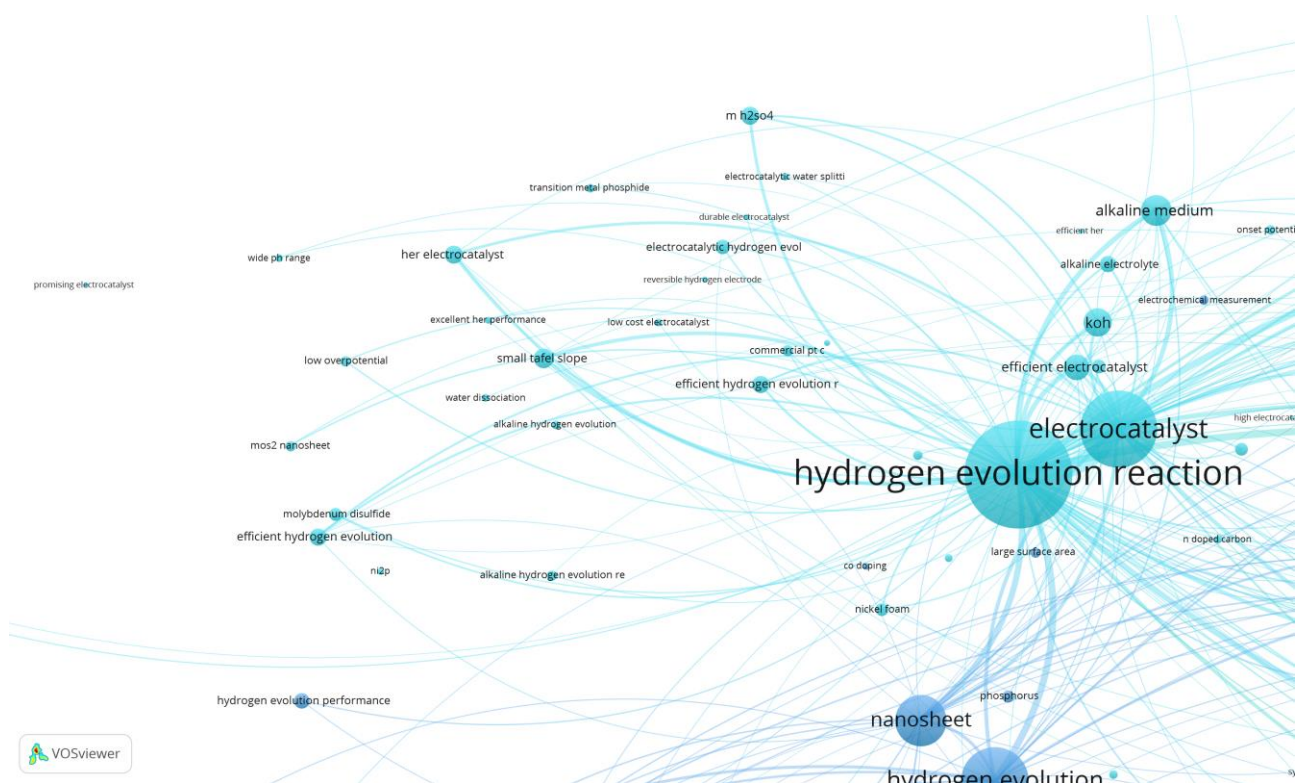


Figure S6. Word cluster (6/7) formed by 74 items extracted from titles and abstract of 148,056 searches on “hydrogen” carried out from 2010 to 2022.

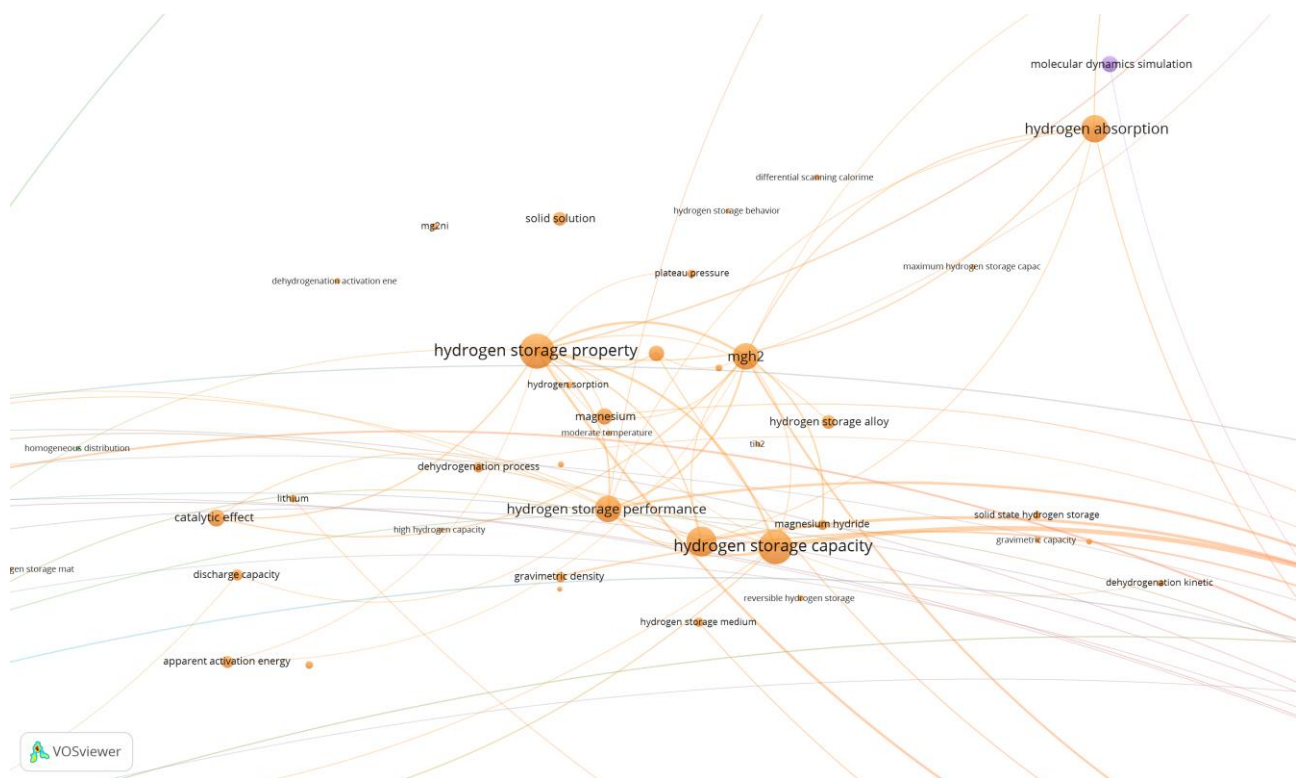


Figure S7. Word cluster (7/7) formed by 45 items extracted from titles and abstract of 148,056 searches on “hydrogen” carried out from January 2010 to September 2021.

Table S1. Important physical-chemical properties of hydrogen gas^a

Physical property	Value
Molar mass / amu	2.016
Normal melting point / K	13.96
Normal boiling point / K	20.39
Bond dissociation enthalpy / (kJ mol ⁻¹)	435.99
Fusion enthalpy / (kJ mol ⁻¹)	0.117
Vaporization enthalpy / (kJ mol ⁻¹)	0.904
Steam pressure / mmHg	54
Air diffusion coefficient / (cm ² s ⁻¹)	0.61
Combustion enthalpy / (kJ mol ⁻¹)	-286.0
Density (gas) / (kg m ⁻³)	0.089
Density (liquid) / (kg m ⁻³)	70.8
Vapor pressure / mmHg	0.997
Higher heating value	141.90 MJ kg ⁻¹ 11.89 MJ m ⁻³
Lower heating value	119.90 MJ kg ⁻¹ 10.05 MJ m ⁻³
Autoignition temperature / K	858
Flame temperature / K	2,318
Critical temperature / K	32.94
Critical pressure / (kN m ⁻²)	1284
Critical density / (kg m ⁻³)	31.40
Air ignition limits / vol%	4-75
Stoichiometric air limits / vol%	29.53

^aData from Greenwood and Earnshaw;¹ Baykara;² Lui *et al.*;³ Emsley;⁴ Abe *et al.*⁵

Table S2. Presenting the most prominent UN Sustainable Development Goals (SDGs) and their respective targets which are either directly or indirectly related to the adoption of the green hydrogen economy^{a,b}

SDG	Targets related to green hydrogen economy
3. Good health and well-being	<p>3.9 reduce the number of deaths and illnesses from hazardous chemicals and pollution from air, water and soil pollution and contamination</p> <p>3.D strengthen the capacity of all countries for early warning, risk reduction and management of national and global health risks</p>
7. Affordable and clean energy	<p>7.1 ensure universal access to affordable, reliable, and modern energy services</p> <p>7.2 increase substantially the share of renewable energy in the global energy mix</p> <p>7.3 double the global rate of improvement in energy efficiency</p> <p>7.A promote access to clean energy research and technology, including renewable energy, and promote investment in energy infrastructure and clean energy technology</p> <p>7.B expand infrastructure and upgrade technology for supplying modern and sustainable energy services for developing countries</p>
9. Industry, innovation and infrastructure	<p>9.1 develop sustainable, resilient, and inclusive infrastructures to support economic development and human well-being</p> <p>9.2 promote inclusive and sustainable industrialization and significantly raise industry’s share of employment and gross domestic product, in line with national circumstances, and double its share in least developed countries</p> <p>9.4 upgrade all infrastructure and retrofit industries to make them sustainable, with increased resource-use efficiency and greater adoption of clean and environmentally sound technologies and industrial processes</p> <p>9.5 enhance scientific research, upgrade the technological capabilities of industrial sectors in all countries</p>

Table S2. Presenting the most prominent UN Sustainable Development Goals (SDGs) and their respective targets which are either directly or indirectly related to the adoption of the green hydrogen economy^{a,b} (cont.)

SDG	Targets related to green hydrogen economy
	11.2 affordable and sustainable transport systems
	11.6 reduce the adverse per capita environmental impact of cities, including by paying special attention to air quality and municipal and other waste management
11. Sustainable cities and communities	11.A support positive economic, social and environmental links between urban, peri-urban and rural areas by strengthening national and regional development planning
	11.B substantially increase the number of cities adopting and implementing integrated policies and plans towards inclusion, resource efficiency, mitigation and adaptation to climate change, resilience to disasters, and develop and implement holistic disaster risk management
	12.2 achieve the sustainable management and efficient use of natural resources
12. Responsible consumption and production	12.4 responsible management of chemicals and waste
	12.5 substantially reduce waste generation through prevention, reduction, recycling, and reuse
	13.1 strengthen resilience and adaptive capacity to climate-related hazards and natural disasters
	13.2 integrate climate change measures into national policies, strategies, and planning
13. Climate action	13.3 build knowledge and capacity to meet climate change
	13.4 implement the UN framework convention on climate change

^aInformation and pictures from UN Sustainable Development Goals;⁶ ^bmost of the SDGs presented here are interlinked to other goals, as critically discussed in the section 10 from the main text. We kindly request to the readers to refer to this part of our study.

References

1. Greenwood, N. N.; Earnshaw, A.; *Chemistry of the Elements*, 2nd ed.; Butterworth-Heinemann: Oxford, 1997.
2. Baykara, S. Z.; *Int. J. Hydrogen Energy* **2018**, *43*, 10605.
3. Lui, J.; Chen, W.; Tsang, D. C. W.; You, S.; *Renewable Sustainable Energy Rev.* **2020**, *134*, 110365.
4. Emsley, J.; *The Elements*, 2nd ed.; Oxford University Press: Oxford, UK, 1992.
5. Abe, J. O.; Popoola, A. P. I.; Ajenifuja, E.; Popoola, O. M.; *Int. J. Hydrogen Energy* **2019**, *44*, 15072.
6. UN Sustainable Development Goals, <https://www.un.org/sustainabledevelopment/>, accessed in March 2022.

