











Country	Institute	Category	Related programs (with short summary)	Target / Goal Outcome	Lead person / Organization	Partnership (if any)	Related information
South Africa	CSIR	Storage	CSIR has been involved in the development of the materials-based hydrogen storage approach with the focus being on porous materials such as metal organic frameworks (MOFs), porous carbon and their composites. Current 	Develop efficient and reliable hydrogen storage technology for light-duty vehicles.	Drs Mkhulu Mathe & Nicholas Musyoka	(Domestic) - North West University, University of South Africa, Tshwane University of Technology, University of Pretoria (International) - University of Nottingham (UK), Lublin University of Technology (Poland) (Desired collaboration) - Institutes in Japan with	https://www.hvsainfrastructure.org/ https://www.csir.co.za/smart-places
			Development of high-pressure composite cylinders (Type IV) with the eventual goal of incorporating the porous materials to derive conditions was done with attractive properties for lightweight hydrogen storage systems. Current 	Develop cylinders for natural gas and hydrogen storage for pressures ranging from 350 bar to 700bar. This to be applied in cars, buses and UAVs	Ashton Swaartbooi/ Dr Mkhulu Mathe, CSIR	(Domestic) - North West University, University of South Africa, Tshwane University of Technology, University of Pretoria (Desired collaboration) - Institutes in Japan with expertise in materials-based hydrogen storage, methanol catalyst development and field testing	https://www.hvsainfrastructure.org/ https://www.csir.co.za/smart-places
		Standards	Localisation of international Hydrogen standards for implementation of hydrogen transportation and stationary solutions in South Africa Current 	To have standards implemented in the introduction of Hydrogen mobility by buses and cars in South Africa	Drs Brian North/ Mkhulu Mathe, CSIR	(Domestic) - North West University, University of South Africa, Tshwane University of Technology, University of Pretoria (International) - University of Nottingham (UK) (Desired collaboration) - Institutes in Japan with expertise in materials-based hydrogen storage.	https://www.hvsainfrastructure.org/ https://www.csir.co.za/smart-places
Japan	AIST	Production	Advancement of Hydrogen Technologies and Utilization Project / Research and development of novel hydrogen production technology by thermal decomposition of methane [2019-2020] Current 	Feasibility study on production of H2 and solid carbon by methane cracking	Dr. Hideyuki Takagi / AIST	(Domestic) NEDO, IHI, Kyoto Univ.	https://www.aist.go.jp/index_en.html
			Lead research and development project for hydrogen utilization technology / Research and development of basic technology for advanced water electrolysis technology for hydrogen production/Advancement of alkaline and polymer-electrolyte water electrolysis [2018-2022] Current 	Formulation of guidelines and establishing the evaluation methods for electrolyte performance, durability characteristics and hydrogen production system to deliver hydrogen at 30 yen/Nm3 at production end	Prof. Shigenori Mitsushima / Yokohama Natl. Univ.	(Domestic) Yokohama Natl. Univ., AIST, Kyoto Univ., Osaka Pref. Univ., Tohoku Univ., Ritsumeikan Univ., De Nora Permelec Ltd	
		Transportation /Storage	International Joint Research Program for Innovative Energy Technology / Hydrogen production and storage technology using CO2 -development of clean hydrogen carrier system using CO2 recycling technology--[2015-2019] Current 	Development of a catalyst for practical application that can generate hydrogen from formic acid with a hydrogen production rate (1m3/h H2/g metal), having durability of 2000 h at 70 MPa.	Dr. Yuichiro Himeda / AIST	(Domestic) JST, Osaka University (International) BNL, PNNL, EPFL	
			Utilization				

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South Africa	CSIR	Climate change	Carbon dioxide utilisation in the production of methanol, other liquid fuels and chemicals 	To produce lowered cost methanol and related products utilizing green hydrogen	Drs Nicholas Musyoka / Mmalewane Modibedi, CSIR	(Desired collaboration) - Institutes in Japan with expertise in materials-based carbon dioxide utilization for production of chemicals	https://www.hysainfrastructure.org/ https://www.csir.co.za/future-production-chemicals
South Africa	CSIR	Climate change	Carbon dioxide capture e.g from biogas upgrading process 	To capture carbon dioxide from non-fossil sources and its utilisation in the production of synthetic fuels and chemicals	Dr Nicholas Musyoka, CSIR	(Desired collaboration) - Institutes in Japan with expertise in carbon dioxide capture	https://www.csir.co.za/future-production-chemicals
Japan	AIST	Artificial Photosynthesis, Solar Chemicals, Solar Fuels	International Joint Research Program for Innovative Energy Technology / Production of useful chemicals using solar energy [2015-2019] 	Proposal and demonstration of cost effective artificial photosynthesis technologies using solar energy	Dr. Kazuhiro Sayama / RCPV, AIST	(Domestic) Universities, Private companies (US) Brookhaven National Laboratory	
		Methanation	Development of Technology for Next Generation Thermal Power Generation Project / Development of Fundamental Technology for Next Generation Thermal Power Generation Project/Developing of CO2 Utilization Technology Project [2017-2019] 	Extraction of technical issues and providing possible solutions for realizing a 400 Nm3/h methanation plant	Dr. Kinya Sakanishi / FREA, AIST	(Domestic) NEDO, INPEX Corporation, Hitachi Zosen Corporation, Nagoya Univ.	
		Power to X					

