FCDIC Report 38th Issue

To World Members

"FCDIC Report No.38" is issued on 30th March 2024. Please refer to the following contents. The topics of this issue are NEDO site which list-ups the fuel cell and hydrogen technology development road-maps, Honda new FCV launched in H_2&FC EXPO and natural hydrogen (hydrogen within the earth or newly called "white hydrogen"). It is appreciated if you give us any comment on this new report.

1. The Journal of Fuel Cell Technology

Spring Issue, Vol.23(No.4) is in progress. It is focused on the CO_2 electrolysis and will be published on April 30.

2. Topics related to fuel cell, hydrogen energy: from January 27 to March 26, 2024

<Government, MLIT, METI, NMRI, RIETI, Tokyo, Yokohama, Jetro>

[NEDO: overview, future initiatives and list of the fuel cell and hydrogen technology development road-maps]

1) "**List of NEDO fuel cell and hydrogen technology development road-maps, 8 road-maps and issues of water-electrolysis identified, with overview and future initiatives**", March 9, 2024
URL: https://www.nedo.go.jp/library/battery_hydrogen.html
In Japanese (4 opened in 2017, 1 in 2022, 2 in 2923, 1 in 2024, totally 8road-maps opened)

[**other topics**]

1) "**Japan-California hydrogen Webinar Feb.7 reported on Feb.15/every archives available**", Feb. 17 Down-loaded, 2024
URL: https://www.sf.us.emb-japan.go.jp/itpr_en/24_0207.html
In English

2) "**Demonstration of FC-powered loading machinery to be conducted in Kobe- and Yokohama Port to FY 2026, Yokohama/rubber-tired gantry crane and Kobe/hydrogen engine**", Feb. 7, 2024
URL: https://www.mlit.go.jp/report/press/port04_hh_000446.html
In Japanese (MRIT: Ministry of Land, Infrastructure, Transport and Tourism)

3) "**Memorandum of Understanding on the social implementation of hydrogen energy between Tokyo Metropolitan Government and the State of New South Wales**", Feb. 6, 2024
URL: https:// www.metro.tokyo.lg.jp/tosei/hodohappyo/press/2024/02/06/documents/12_04.pdf
In English

4) "**Japan-Korea Director-General meeting held in the field of hydrogen and derivatives, including ammonia-**", Feb. 16, 2024
URL: https://www.meti.go.jp/english/press/2024/0216_001.html
In English (Japanese issue available in this URL)

5) "**Carbon-neutral port initiatives**", Feb. 19 latest up-dated, 2024

URL: https://www.city.yokohama.lg.jp/lang/overseas/port/kankyo/cnp/initiatives.html
In English

6) "**Thermodynamic performance of an Internal reheat gas turbine (IRGT) with hydrogen combustion; PDF, 20pp**", Feb. 24 down-loaded, 2024
URL: https://www.nmri.go.jp/service/repository_data/PNM12240302-00.pdf
In English (NMRI: National Maritime Research Institute)

7) "**Carbon-neutral port initiatives**", Feb. 19 latest up-dated, 2024
URL: https://www.city.yokohama.lg.jp/lang/overseas/port/kankyo/cnp/initiatives.html
In English

8) "**Road traffic flow and air pollution concentrations: Evidence from Japan**", March 9 down-loaded, 2024
URL: https://www.rieti.go.jp/en/columns/v01_0209.html
In English (RIETI: Research Institute of Economy, Trade and Industry)

9) "**Minister Saito holds meeting with H.E.Tengku Muhammada Taufik, president and group CEO of Petrolian National Berhad (PETRONAS), Malaysia**", March 5, 2024
URL: https://www.meti.go.jp/english/press/2024/0305_001.html
In English

10) "**Asia-Pacific Hydrogen 2024 Summit & Exhibition Sept. 12-13 in Brisbane**", March 9 down-loaded, 2024
URL: https://www.jetro.go.jp/en/database/j-messe/tradefair/detail/135094
In English

<Business Papers and Sites>

[General Topics]
<Honda, collaboration with GM and new FCV >
1) "**Honda, General Motors starts joint commercial production of hydrogen fuel cells in Michigan, U.S./photo of the FC-system available**", Jan. 29, 2024
URL: https://japannews.yomiuri.co.jp/business/companies/20240129-165393/ in English
URL: https://www.jetro.go.jp/biznews/2024/02/59b43b7db11e1fc1.html in Japanese

1') "**Honda begins mass-production of affordable fuel cell system by a venture of Honda and GM**", Feb. 19, 2024
URL: https://www.asahi.com/ajw/articles/15154331
In English

2) "**Honda presents world premiere of production model of "CR-V" at H2 &FC EXPO Tokyo/ Source: Honda Motor, All new fuel cell SUV features plug-in charging function**", Feb. 29, 2024
URL: https://www.jcnnewswire.com/pressrelease/89323/3/Honda-Presents-World-Premiere-of-Production-Model-of-CR-V-e:FCEV-at-H2-&-FC-EXPO-Tokyo
In English

2') "**Honda new-type 'CR-V e:FCEV' installed FC system with 1/3 cost**", Feb. 28, 2024
URL: https://car.watch.impress.co.jp/docs/news/1572057.html

In Japanese

Other URL on Honda new FCEV
URL: https://japannews.yomiuri.co.jp/business/companies/20240228-171572/ Feb. 28, 2024, in English
URL: https://toyokeizai.net/articles/-/737223?page=2 Feb. 28, 2024, in Japanese
URL: https://www.webcg.net/articles/-/49800 Feb. 28, 2024, in Japanese

<**Natural hydrogen (hydrogen in the earth/white hydrogen)**>
1) "**Geologists forecast rise of new era with rush of hydrogen/hydrogen within the Earth**", Feb. 21, 2024
URL: https://menafn.com/1107878322/Geologists-forecast-rise-of-new-era-with-rush-of-hydrogen
In English

2) "**New 'Gold-rush' expected, natural hydrogen of 50 thousand years under the ground, worth $5x10^{12}$ ¥**", Feb. 27, 2024
URL: https://news.yahoo.co.jp/articles/2de5d56a41f95ce60d8e8a17501316e2136f18a0
In Japanese

<**Other Topics**>
1) "**TOPPAN's new technology on CCM/MEA**", Feb. 1, 2024
URL: https://news.yahoo.co.jp/articles/9647fdf3105df64db69ed55d89533b6f6a38288a
In Japanese

2) "**First plant to be operated under hydroelectric power alliance goes online by Mitsbishi Corporation and Hokkaido Electric Power Company**", Feb. 1, 2024
URL: https://www.jcnnewswire.com/english/pressrelease/88819/3/First-Plant-to-be-Operated-
In English

3) "**AGC to build new facility for FORBLUETM S-Series, a fluorinated ion-exchanged membranes suitable for green hydrogen production in Kitakyushu City"**, Jan. 30, 2024
URL: https://www.agc.com/en/news/detail/1205904_2814.html
In English

4) "**Airbus, more European aviation firms explore hydrogen future**", Feb. 2, 2024
URL:https://ja.flightaware.com/squawks/view/1/24_hours/popular/94956/Airbus_More_European_Aviation_Firms_Explore_Hydrogen_Future
In English

5) "**Commencement of joint study to establish ammonia supply base in Soma Area, Fukushima Prefecture with other four companies**", Jan. 30, 2024
URL: https://www.mitsui.com/jp/en/topics/2024/1248355_14380.html
In English

6) "**Chiyoda Corp. and Toyota jointly developing large-scale electrolysis system/Fusing FC and construction technologies for H_2 production markets in Japan and overseas**", Feb. 5, 2024
URL: https://www.chiyodacorp.com/media/240205_e.pdf
In English
Japanese URL available: https://www.chiyodacorp.com/media/240205.pdf

7) "**Chubu Centrair international airport introduces FC bus for terminal shuttle service**", Feb. 7, 2024
URL: https://en.traicy.com/posts/202402074404/
In English (available "for more information in **Japanese**" in the URL)

8) "**IHI/ To manufacture hydrogen with natural gas pyrolysis/ Newly installed prototype device at Yokohama Works, using iron ore as catalyst**", Feb. 9, 2024
URL: https://www.japanmetaldaily.com/articles/-/140867
In English

9) "**Kobe-Osaka international port launches demonstration of advancedcargo handling machinary at Hanshin Port container terminal - World's first rubber-tired gantry (RTG) crane converted to hydrogen engine, achieving decarbonized port and harbor operations- by MOL, Iwatani, Mitsui E&S et al**", Feb. 7, 2024
URL: https://www.mol.co.jp/en/pr/2024/24021.html
In English

10) "**Puro^{R} Hydrogen Fuel Cell System: Introduction of Suiso Power**", Feb. 17 down-loaded, 2024
URL: https://www.suisopower.jp/puro/introduction/#
In English

11) "**Nippon Express Logistics (Thailand) introduces its first FC truck, photo available**", Feb. 16, 2024
URL: https:// kyodonewsprwire.jp/release/202402136482
In English

12) "**MOL teams up with Australian energy company Woodside, South Korean shipbuilder HD KSOE and shipping firm Hyundai Glovis to study transport of liquefied Hydrogen, CG of Liq.H_2 carrier available**", Feb. 14, 2024
URL: https://www.mol.co.jp/en/pr/2024/24022.html
In English

13) "**Advanced helium-cooled reactor to be given power-loss test: Aim is to verify safety of reactor shutdown system**", Feb. 11, 2024
URL: https://japannews.yomiuri.co.jp/science-nature/science/20240211-168331/
In English

14) "**Rising demand for hydrogen-based, Fuel cell electric vehicle (FCEV) trucks in north America**", Feb. 23, 2024
URL: https:// menafn.com/1107892026/Rising-Demand-For-Hydrogen-Based-Fuel-Cell-Electric-Vehicle-FCEV-Trucks-In-North-America
In English

15) "**IHI to exhibit hybrid power-promotion system in H_2&FC EXPO, available descriptive sketch**", Feb. 27, 2024
URL: https://www.ihi.co.jp/all_news/2023/aeroengine_space_defense/1200674_3544.html
In English

16) "**Media watch test of JR East hydrogen-powered train**", Feb. 28, 2024
URL: https://www3.nhk.or.jp/nhkworld/en/news/20240228_25/
East Japan Railway has given the media a look at a test run of its hydrogen fuel cell-powered train. The company aims to reduce the use of fossil fuels in operations to help realize a carbon-free society.

JR East developed the train with Toyota Motor and Hitachi. It's equipped with hydrogen tanks on the roof.

The hydrogen reacts with oxygen in the air using fuel cells fitted beneath the car to produce electricity. The process doesn't any CO_2 in the atmosphere.

The train can run for about 140 kilometers with full tanks and has a top speed of 100 kilometers per hour. JR East says there are no discernible differences in shaking and noise levels compared to conventional models.

The train has conducted about 4,000 kilometers of test runs so far. The railway firm aims to improve the model by installing larger hydrogen tanks and have it running commercially in fiscal 2030.

16') "**Environmental Initiatives of The JR East Group**", March 6, 2024
URL: https://www.jreast.co.jp/e/investor/pdf/202403_e_irday.pdf
In English

17) "**Storing CO_2 underground: Practical use of CCS technology essential for decarbonization**", Feb. 27, 2024
URL: https://japannews.yomiuri.co.jp/editorial/yomiuri-editorial/20240227-171428/
In English

18) "**MOL, ITOCHU, HIF and JFE Steel sign MoU on establishing supply chain for sunthetic fuel and CO2 marine transport using green hydrogen: role of each company available /HIF(USA) e-fuel business**", Feb 27, 2024
URL: https://www.mol.co.jp/en/pr/2024/24027.html
In English

19) "**Mitsui to test FC-powered crane in California/ Photo available**", March 3, 2024
URL: https://sp.m.jiji.com/article/show/3179130
In Japanese

20) "**World's first successful hydrogen combustion operation with a large marine engine/ Photo available**", March 7, 2024
URL: https://www.mes.co.jp/english/press/2024/0307_002400.html
In English

21) "**TKK group to install 500 kW fuel cell in Shonan-factory to be operated in 2026/ H2Rex™**", March 12, 2024
URL: https://prtimes.jp/main/html/rd/p/000000059.000031501.html
In Japanese

22) "**MHI selected as licensor of CO_2 capture technology for leading low carbon hydrogen production project in Cheshire, UK**", March 13, 2024
URL: https:// www.jcnnewswire.com/pressrelease/89525/3/MHI-Selected-as-Licensor-of-CO2-Capture-Technology-for-Leading-Low-Carbon-Hydrogen-Production-Project
In English

23) "**Hitachi Zosen to conclude a memorandum on methanation demonstration in Oman ~Basic design of pilot plant~**", March 12, 2024
URL: https://www.hitachizosen.co.jp/english/newsroom/news/release/assets/pdf/FY2023-97.pdf
In English

24) "**Tokyo Gas Group Carbon Neutrality Roadmap 2050**", March 22, 2024
URL: https:// www.tokyo-gas.co.jp/en/IR/support/pdf/20240322-03e.pdf
In English

20) "**MOL, Idemitsu, HIF team up to develop e-fuel/e-methanol supply chain, including marine transport of CO_2/ MOL; Mitsui O.S.K. Lines, HIF: USA and Asia Pacific**", March 19, 2024
URL: https://www.mol.co.jp/en/pr/2024/24035.html
In English

[**Market Information**]

1) "**FCV market size, share, trend report: forecast on type, region and segment 2023-2030: summary, detailed contents and free sample available**", Feb. 1, 2024
URL: https://newscast.jp/news/2029599
In Japanese

2) "**Global fuel cell power pack market insights, forecast to 2030: 111pp in English, free sample available**", Jan. 31, 2024
URL: https://www.gii.co.jp/report/qyr1418884-global-fuel-cell-power-pack-market-insights.html
In English

3) "**Market size of FCV to be expected to 37 billion $ in 2030: summary, detailed contents and free sample available**", Feb. 6, 2024
URL: https://japan.zdnet.com/release/30940706/
In English

4) "**8 carbon & graphite fiber manufacturers in 2024**", Feb. 10 down-loaded, 2024
URL: https://us.metoree.com/categories/6021/
In English

5) "**Hydrogen generation market 2021-2031; Trends, opportunities, and global analysis**", Feb. 5, 2024
URL: https://menafn.com/1107810057/Hydrogen-Generation-Market-2021-2031-Trends-Oportunities-And-Global-Analysis
In English

6) "**Asia pacific SOFCc market anticipates dynamic growth through 2028 amidst rising demand for clean energy solutions**", Feb. 14, 2024
URL: https:// menafn.com/1107852368/Asia-Pacific-Solid-Oxide-Fuel-Cells-Market-Anticipates-Dynamic-Growth-Through-2028-Amidst-Rising-Demand-For-Clean-Energy-Solutions
In English

7) "**Hydrogen energy suppliers in Japan (Domestic production and imported) projected to reach 1 million tons by FY2028: market forecast and overview available**", Feb. 14, 2024
URL: https://www.yanoresearch.com/en/press-release/show/press_id/3436
In English

8) "**Global bipolar plates for H_2 fuel cell system market research report 2024-2030: sample PDF available**", Feb. 23, 2024
URL: https://plaza.rakuten.co.jp/writovy/diary/202402230048/
In English

9) "**Report on global fuel cell market by YH Research: detailed contents and URL on overview, free sample available**", Feb. 24 down-loaded, 2024
URL: https://newscast.jp/news/5112774
In Japanese

10) "**Global market to be expected up to 58 billion $ by 2032: free sample available**", Feb. 27, 2024
URL: https://newscast.jp/news/7960108
In Japanese

11) "**Hydrogen fuel cell market size, competitive landscape, and regional analysis: A comprehensive report 2024-2030: free sample available**", March 8, 2024
URL: https://tomoruba.eiicon.net/blogs/146533
In English

12) "**Fuel cell 'gas diffusion layer (GDL)' market: profit in 2024 and growth driver to 2031, free sample available**", March 21, 2024
URL: https:// jp.linkedin.com/pulse/燃料電池ガス拡散層 gdl-市場-2024-収益と成長ドライバー-2031-pr-news-hub-xmjyc
In Japanese

<General papers & other publications>

1) "**Toward a better way of releasing hydrogen stored in hydrogen boride sheets/Prof. Yamaguchi, Titech; DOI: 10.1002/smll.202310239**", Feb. 9, 2024
URL: https://www.titech.ac.jp/english/news/2024/068477
In English

2) "**Newly discovered carbon mono oxide-runaway gap help identify habitable exoplanets; DOI:10.3847/1538-4357/ad10a2, corresponding author Prof. Ozaki /Titech** ", 10th Feb. down-loaded, 2023
URL: https://www.titech.ac.jp/english/news/2024/068469
In English

3) "**Pursuing polymer electrolyte fuel cells with applications for heavy duty vehicles/ Prof. Rikukawa, Sophia University**", Feb. 15, 2024
URL:https://www.sophia.ac.jp/eng/article/feature/the-knot/the-knot-0200/ In English
URL:https://www.sophia.ac.jp/jpn/article/feature/the-knot/the-knot-0200/ In Japanese

4) "**Gas-species dependence of permeation flow in SOFC porous anode fabricated with pore formers, DOI information available K.Yamazaki, H. Iwai et al**", March 23 down-loaded, 2024
URL: httpa://www.jstage.jst.go.jp/article/jtst/19/1/19_23-00492/_article/-char/ja
In Japanese

5) "Development of general-purpose H_2 burners and their applications for industrial furnaces/DOI available Chugai-Ro Co., Ltd.", March 23 down-loaded, 2024
URL: https://www.jstage.jst.go.jp/article/hess/47/2/47_83/_article/-char/en
In English

6) "Valence state of cerium ion radical quencher in polymer electrolyte membranes in Mem, SR Center Ritsumeikan Univ., No.25, 30 (2023) /1pp PDF ", March 23 down-loaded, 2024
URL: https:www.ritsumei.ac.jp/acd/re/src/memoirs/no25/no25p030.pdf
In English

**The URLs are not always permanent. The article and its URL are examined this month.*

3. The 21st H2&FC Expo 2024 (FCDIC Co-organized)

RX Japan held the 21st H2&FC EXPO 2024 spring from February 28 to March 1 at Tokyo Big Sight on-site only, co-organized by FCDIC. Total participants increase up to about 69,000 to the level of common year before COVID-19. Also, there are many exhibitors including from abroad, almost filled in 1st floor in West Hall.

4. Future Events

The 31st Fuel Cell Symposium

The 31st Fuel Cell Symposium is scheduled on May 23 and 24. Program preparation is in progress.
The symposium will be held under the hybrid of on venue and on-line.
Entry could be accepted on our WEB (URL: https://www.fcdic.jp/symposium/) in Japanese

Hydrogen Power Technological & Engineering Solutions International Symposium (HYPOTHSIS XIX)

HYPOTHESIS XIX will be held on July 14 to 18, 2024 in Hiroshima with co-organized by FCDIC
Detail is referred in URL: https://www.hypothesis.ws

The 4th H_2 & FC EXPO 2024, Autumn

The 4th H_2 & FC EXPO Autumn is scheduled to be held on October 2 to 4 at Makuhari-Messe in Chiba Prefecture.
Details will be announced later; URL: https://www.wsew.jp/hub/en-gb/about/fc.html

5. FCDIC Award 2023 fy (All English titles are tentative)

Awards in Industry

Japan Automobile Research Institute
"**Development of single cell (JARI standard cell and JARI cell-2) for research**"

Incentive Award

Yuuki Sugawara (Assistant Professor, Tokyo Institute of Technology)
"**Effective design of base metal electrode catalysts adopted by materials-informatics**"

The lectures done in the 31th FC symposium and the articles subscribed in the journal of FCDIC, Vol.24 No.1.