

南アフリカで研究しよう！

Eudy MABUZA

Minister-Counsellor: S&T

Embassy of the Republic of South Africa

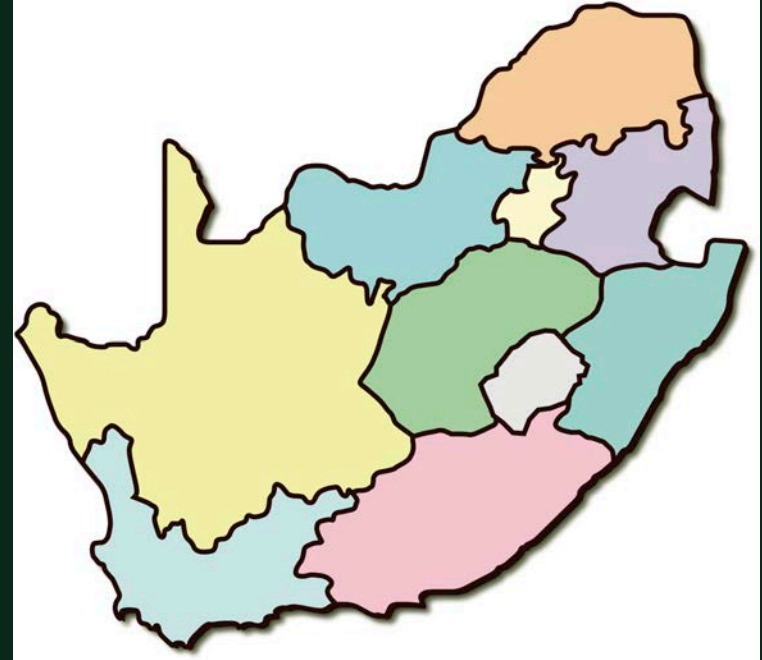


South Africa: Living Laboratory





Where is South Africa ?



51 million population
1,220,813 km²
11 official language
9 provinces



www.dst.tokyo
South Africa: Living Laboratory



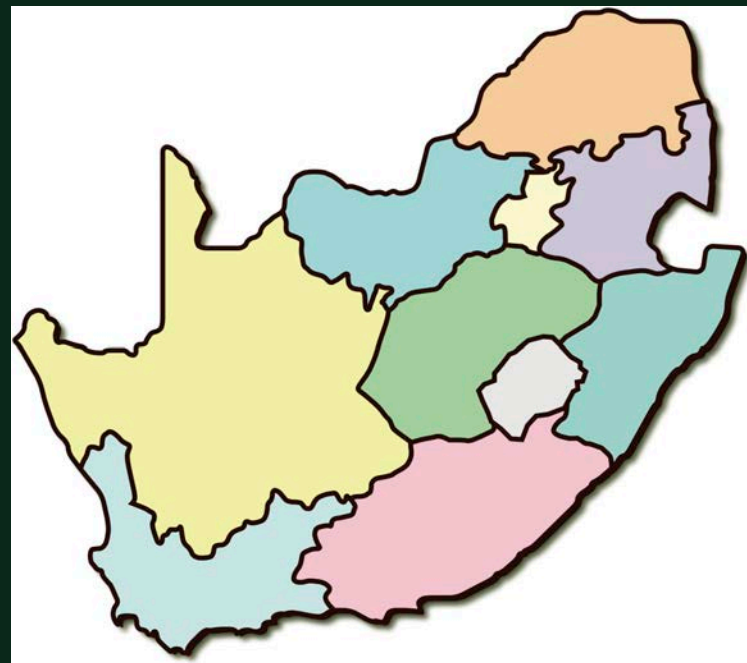
South African Embassy
Tokyo, JAPAN

在日南アフリカ共和国大使館





南アフリカどんなところ？



5,100万人
1,220,813 km²
11公用語
9地方



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In South Africa

生物多様性と生態学

Biodiversity & Ecology

3 Biodiversity hotspots

In South Africa

24000 plants
243 mammals
800 birds
370 reptiles
220 fish
80000 insects

Coexist with
economical
development



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南アフリカで

生物多様性と生態学

Biodiversity & Ecology

3つの生物多様性ホットスポット

国内には

24000 植物
243 哺乳類
800 鳥類
370 爬虫類
220 魚類
80000 昆虫

が生息する

経済発展と共存



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In South Africa



Sediba セディバ

Australopithecus, around 2 million years ago

Discovered at the Mlaba site of the World Heritage Cradle of Humankind

Some parts of female and boy

Lots of fossil of humankind including perfect body structure of Little Foot from 3 million year ago



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南アフリカで



Sediba セディバ

約2万年前に生息した猿人アウストラロピテクス

2008年に世界遺産の人類のゆりかご (Cradle of Humankind) のマラパ遺跡で発見

女性の骨格の一部と男の子が同時発掘

300万年前のリトルフット(完全な骨格)などヒト科の化石が世界で最も豊富に眠っている



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In South Africa

感染症研究

Infectious Diseases

- ◆ HIV/AIDS
- ◆ Tuberculosis
- ◆ Malaria



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南アフリカで

感染症研究

Infectious Diseases

- ◆ HIV/AIDS
- ◆ 結核
- ◆ マラリア



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In South Africa

バイオセーフティーレベル4実験施設

BSL-4 Laboratory at National Institute for Communicable Diseases

The world top safest level experiment facility approved by WHO

Able to handle all pathogen and virus



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南アフリカで

バイオセーフティーレベル4実験施設

BSL-4 Laboratory at National Institute for Communicable Diseases

WHO認定の最高度安全実験施設

全ての病原体、ウィルスの検査・解析が可能



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In South Africa

HySA Systems
Hydrogen South Africa

► Metal Hydride Materials

In March 2014 HySA Systems Competence Centre plans to launch a production facility for the manufacturing of Metal Hydride (MH) materials for hydrogen storage and thermally-driven compression, as well as for NEMH batteries.

The facility based on locally developed induction melting and annealing furnaces will be able to daily produce up to 25 kg of the MH materials for use in HySA Systems MH hydrogen storage / supply units and hydrogen compressors, as well as to be exported to various customers.

The facility will manufacture the MH materials from the abundant South African feedstock, according to new technology recently developed at HySA Systems (Patents ZA2013/03814, ZA2013/08851).

MH materials: AB_2 , A_2B_3 and AB_2 type alloys.

Customized compositions according to customer's specifications, including target Pressure/Concentration/Temperature performance for Hydrogen absorption / desorption.

Load capacity (melting & annealing) 25 kg.

HySA Systems Competence Centre
South African Institute for Advanced Materials Chemistry
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Pretoria Bay 611, South Africa

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SAIAMC
SOUTH AFRICAN INSTITUTE FOR ADVANCED MATERIALS CHEMISTRY

UNIVERSITY OF THE WESTERN CAPE

水素研究開発拠点

Hydrogen South Africa (HySA)

90% world platinum

Moving towards a knowledge based economy

3 centres of excellence

- ❖ Hydrogen related system
- ❖ Hydrogen infrastructure
- ❖ Catalysis for fuel cell

2 kW_e HT-PEMFC Breadboard CHP System

► GENERAL DATA

Specification	
Electrical / thermal power	2.0 kW _e / 2.0 kW _t
Anode input	Hydrogen or reformate from external reforming module
Cathode input	Ambient dry air
Reformate flow rate	120 Nm ³ /h (reforming capacity: 1 Nm ³ CH ₄ → 2 Nm ³ CO, 2 Nm ³ CO ₂ → 4 Nm ³ H ₂)
Catalytic burner	0.4 kW _e
Dimensions (L x W x H)	90 x 170 x 100 cm

► FUEL CELL STACK

Fuel Cell Stack	
Fuel cell type	Externally air-cooled HT-PEMFC
Number of cells	20
Electrode active area	90 cm ²
Peak / nominal power	2200 W _e / 2000 W _e
Stack nominal / peak current	40 A / 60 A
Stack nominal DC voltage	12.5 V
Anode / cathode reactant	Dry hydrogen or reformate / dry air
Anode / cathode efficiency	80 / 70 % @ 25 °C
Operating temperature / pressure	160 - 180 °C / ambient to 0.4 bar _g

► LAYOUT AND CONTROL

HySA Systems
Hydrogen South Africa

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南アフリカで

水素研究開発拠点

Hydrogen South Africa (HySA)

世界90%の白金

知識ベース経済へ

3つの研究拠点

- ❖ 水素関連システム
- ❖ 水素社会インフラ
- ❖ 燃料電池用触媒

HySA Systems
Hydrogen South Africa

► Metal Hydride Materials

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The facility will manufacture the MH materials from the abundant South African feedstock, according to new technology recently developed at HySA Systems (Patents ZA2013/0824, ZA2013/0881).

MH materials AB₂, A₂B₇ and AB₅ type alloys

Customised compositions according to customer's specifications, including target Pressure/Concentration/Temperature performance for hydrogen absorption / desorption

Load capacity (melting & annealing) 25 kg

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Email: bpollet@hyasystems.org
Web: www.hyasystems.org

2 kWe HT-PEMFC Breadboard CHP System

Specification

Electrical / thermal power	2.0 kW _e / 3.3 kW _t
Reactant type	Hydrogen or reformate from external mixing stack
Cathode input	Ambient dry air
Reformate Purity	CO 50 ppm, CH ₄ 10 ppm, C ₂ H ₆ 10 ppm, C ₃ H ₈ 10 ppm, C ₄ H ₁₀ 10 ppm, C ₅ H ₁₂ 10 ppm, C ₆ H ₁₄ 10 ppm, C ₇ H ₁₆ 10 ppm, C ₈ H ₁₈ 10 ppm, C ₉ H ₂₀ 10 ppm, C ₁₀ H ₂₂ 10 ppm, C ₁₁ H ₂₄ 10 ppm, C ₁₂ H ₂₆ 10 ppm, C ₁₃ H ₂₈ 10 ppm, C ₁₄ H ₃₀ 10 ppm, C ₁₅ H ₃₂ 10 ppm, C ₁₆ H ₃₄ 10 ppm, C ₁₇ H ₃₆ 10 ppm, C ₁₈ H ₃₈ 10 ppm, C ₁₉ H ₄₀ 10 ppm, C ₂₀ H ₄₂ 10 ppm, C ₂₁ H ₄₄ 10 ppm, C ₂₂ H ₄₆ 10 ppm, C ₂₃ H ₄₈ 10 ppm, C ₂₄ H ₅₀ 10 ppm, C ₂₅ H ₅₂ 10 ppm, C ₂₆ H ₅₄ 10 ppm, C ₂₇ H ₅₆ 10 ppm, C ₂₈ H ₅₈ 10 ppm, C ₂₉ H ₆₀ 10 ppm, C ₃₀ H ₆₂ 10 ppm, C ₃₁ H ₆₄ 10 ppm, C ₃₂ H ₆₆ 10 ppm, C ₃₃ H ₆₈ 10 ppm, C ₃₄ H ₇₀ 10 ppm, C ₃₅ H ₇₂ 10 ppm, C ₃₆ H ₇₄ 10 ppm, C ₃₇ H ₇₆ 10 ppm, C ₃₈ H ₇₈ 10 ppm, C ₃₉ H ₈₀ 10 ppm, C ₄₀ H ₈₂ 10 ppm, C ₄₁ H ₈₄ 10 ppm, C ₄₂ H ₈₆ 10 ppm, C ₄₃ H ₈₈ 10 ppm, C ₄₄ H ₉₀ 10 ppm, C ₄₅ H ₉₂ 10 ppm, C ₄₆ H ₉₄ 10 ppm, C ₄₇ H ₉₆ 10 ppm, C ₄₈ H ₉₈ 10 ppm, C ₄₉ H ₁₀₀ 10 ppm, C ₅₀ H ₁₀₂ 10 ppm, C ₅₁ H ₁₀₄ 10 ppm, C ₅₂ H ₁₀₆ 10 ppm, C ₅₃ H ₁₀₈ 10 ppm, C ₅₄ H ₁₁₀ 10 ppm, C ₅₅ H 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In South Africa



天文学と最新電波天文学

Astronomy & Latest Radio Astronomy

Stars and universe from southern hemisphere

Clear and dark sky

Global Infrastructure

- ❖ SALT: 11m optical telescope
- ❖ IRSF: Near-infrared Survey Facility
- ❖ SKA (Square Kilometre Array)



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きれいで暗い空

最新設備

- ❖ SALT 11m光学望遠鏡
- ❖ IRSF 近赤外線天体観測施設
- ❖ SKA (Square Kilometre Array)



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WORLD.”**

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