Briefing on Business Developments

CDW Group New Business Introduction

Disclaimer

This presentation contains forward-looking statements which can be identified by the context of the statement and generally arise when the Company is discussing its beliefs, estimates or expectations. Such statements may include comments on industry, business or market trends, projections, forecasts, and plans and objectives of management for future operations and operating and financial performance, as well as any related assumptions.

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CONTENTS /目次

April 30, 2019

① LCD Backlight Units

② Chemical and Health

③ Micro-Nano Bubble

From small-sized displays to medium-sized displays

Currently, demand for small-sized OLED displays is rising, and demand for small-sized LCD displays is falling.

As a response to the changing market, we plan to:

- Shift production from small-sized LCD displays to medium-sized LCD displays
- Enter the growing automobile and notebook computer markets

01

LCD Backlight Units

LCD Backlight Units – Current Production and Production Target

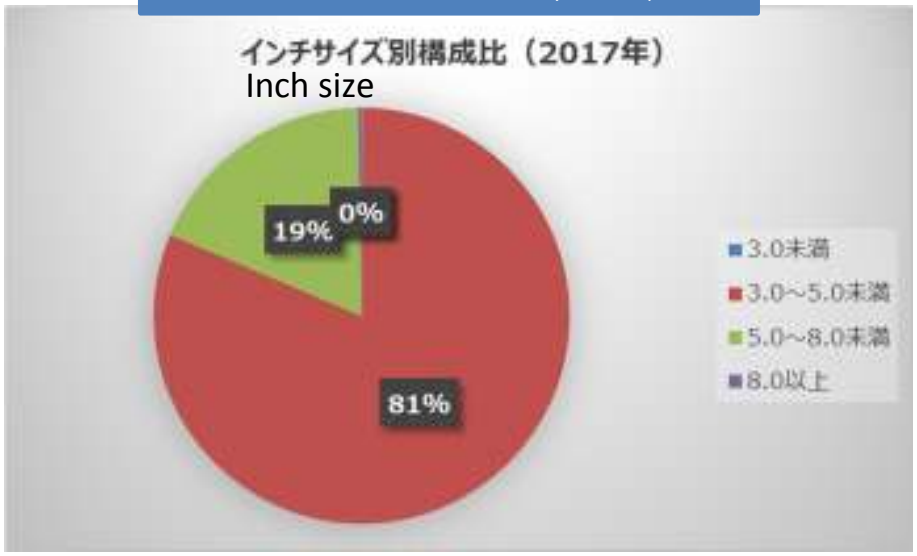
【 Production Ratio for 2017】

- Small-sized units (smartphones, gaming consoles)

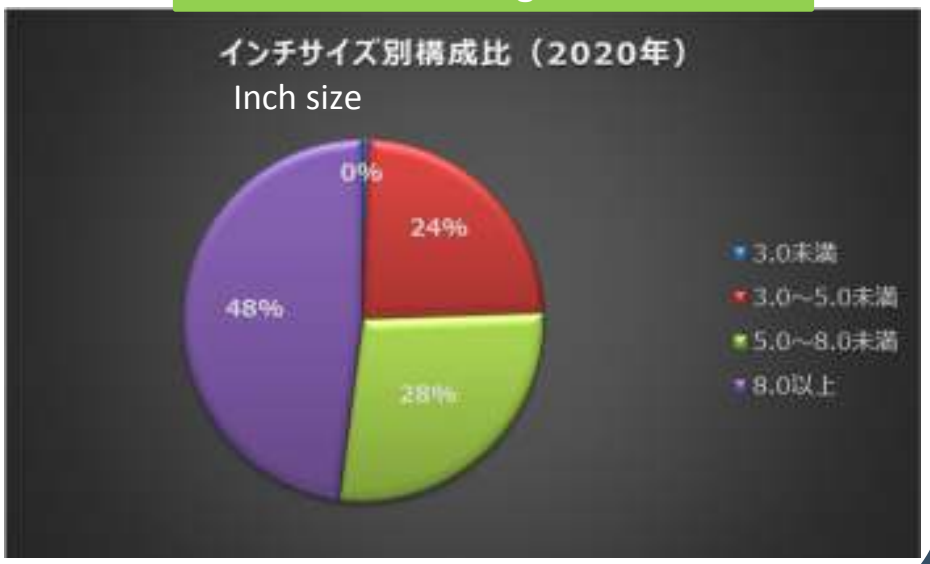
【 Production Target for 2020】

- Medium-sized units (automobile displays, notebook computers)
- Development of new technologies to build higher quality models

Production Ratio （2017）



Production Target （2020）



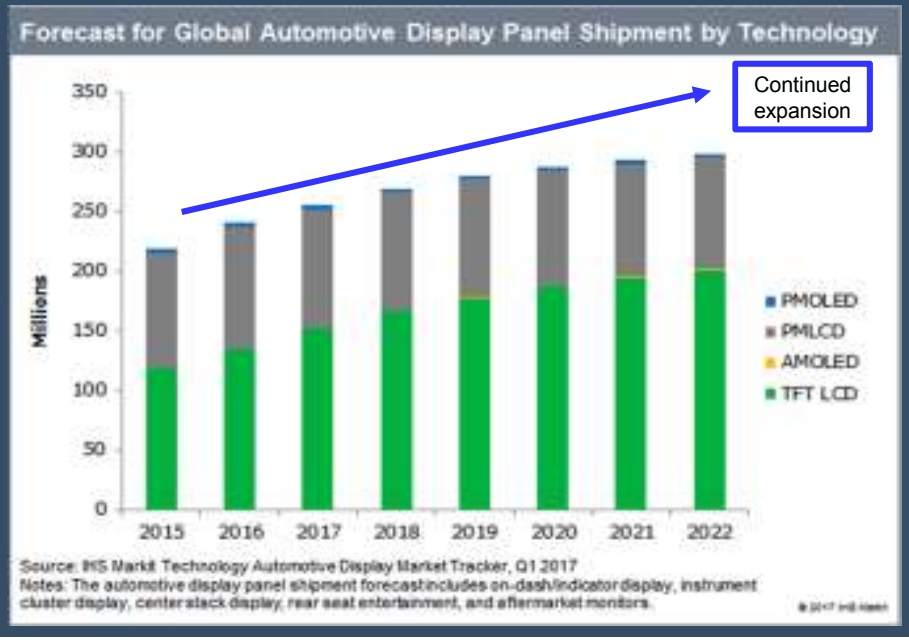
LCD Backlight Units –In-vehicle Information Display for Automobiles

【 Current situation 】

- There is steady growth in the In-vehicle Information Display (IID) market
- Our products are currently being used by five major companies - three in Europe, one in US and one in Japan
- Our key customer's core business is also in IID
- Our key customer's strategy has shifted to low cost, high quality, and high value added

【Our solution】

- Increased automation
- Reduced procurement costs
- Development of new technologies



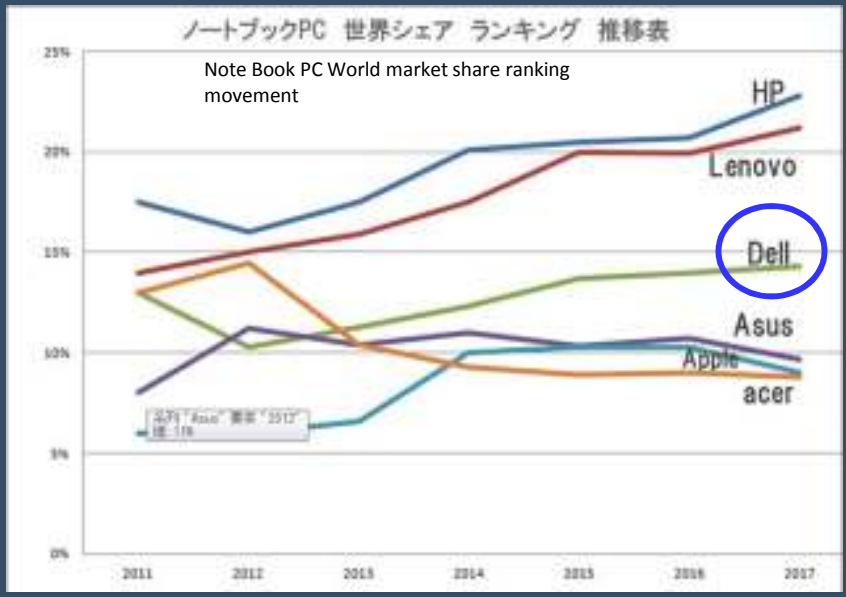
LCD Backlight Units – Notebook Personal Computers

【 Current Situation 】

- HP, Lenovo, and DELL remain the top three players in the notebook PC market.
- Shipment volume from the top three players have increased; overall shipment volume remains unchanged
- High demand for notebook PC for business use
- Stable demand for notebook PC is expected due to having a different target segment to tablet PC

【Our advantage/solution】

- Currently receiving orders for high quality LCD BLUs from our customers
- Plans to increase automation



Conventional Direct BLU vs. CDW's Direct BLU

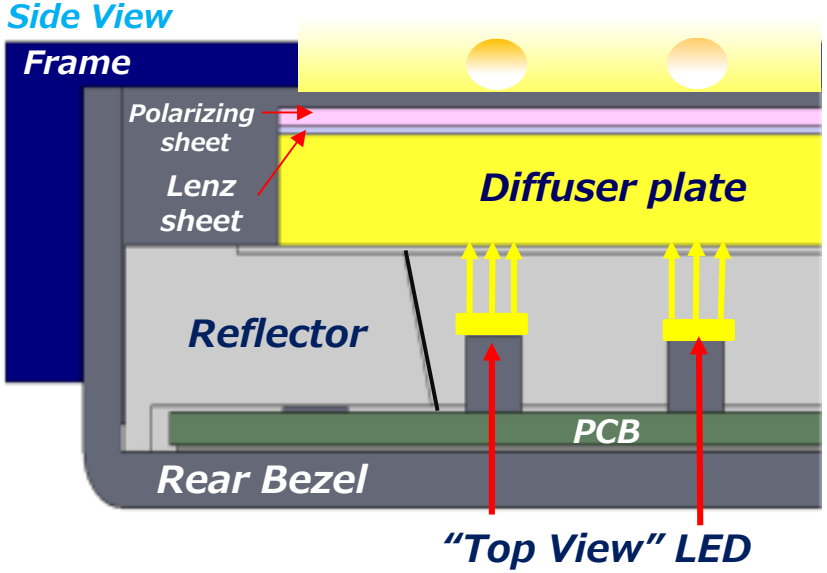
Currently in Development

Conventional Method

Conventional Direct BLU

- **LED points directly at the Diffuser**
- **LED bulb may become visible on the screen**
- **Thickness of BLU is increased to compensate**

Side View

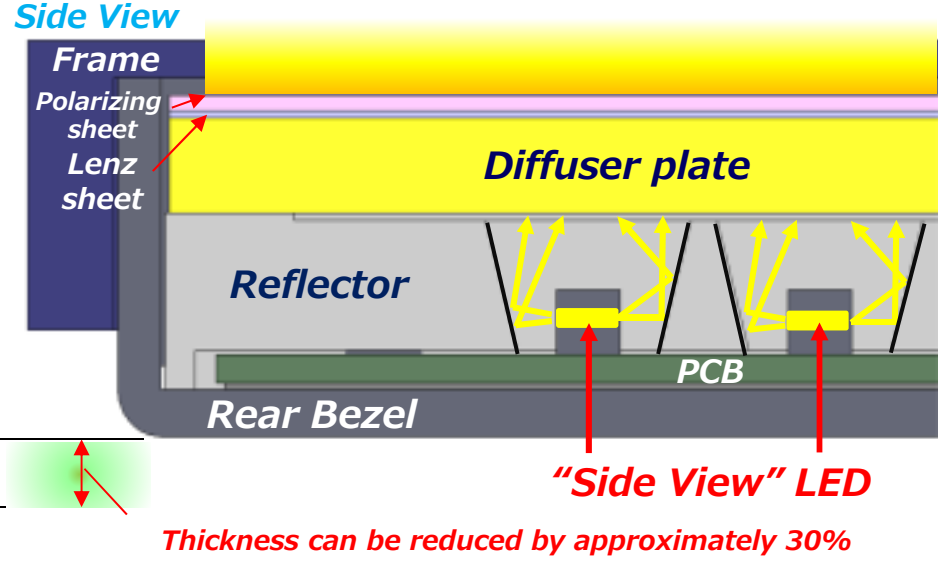


CDW Method

CDW's Direct BLU

- **LED points to the side; light is reflected at the Diffuser**
- **LED bulb cannot be seen on the screen**
- **Thickness of BLU can be reduced**

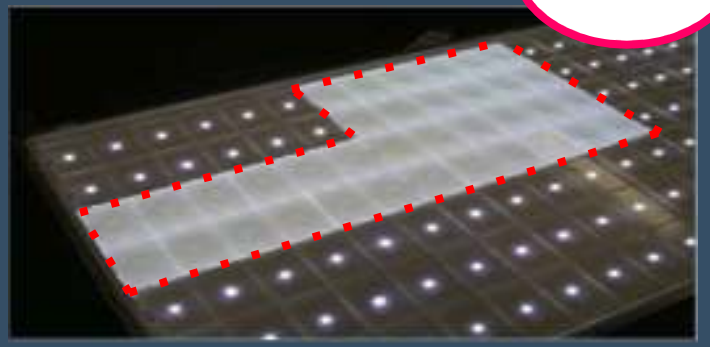
Side View



Thickness can be reduced by approximately 30%

Direct BLU + Local Dimming Control

Currently in Development



What is Local Dimming Control?

- A system where each panel has its own LED which can be individually switched on or off
- Greater control in contrasting light and dark areas
- Images are displayed more clearly as a result
- Low power consumption

Direct BLU + Local Dimming Control

By combining the lighting ability of the Direct BLU currently under development with Local Dimming Control, we can create a clearer brightness/darkness contrast of the backlight area.

Markets under consideration

- **Automobile market (instrument panel display area, external lighting)**
- **Lighting market**
- **Living Environment Market (House makers and interior decorators)**

Business through using patents

We have entered an advisory relationship with a number of renowned professors in the medical field. These professors hold patents for technologies which can see commercial use.

Out of these, technologies in the following areas are the closest to commercialisation:

- License Business of Generic Drugs
- License Business of Organic Compounds

02

Chemical and Health

Akira Suzuki

Awards

1987 Korean Chemical Society Testimonial
1989 Chemical Society of Japan Award
2004 Special Award in Synthetic Organic Chemistry, Japan
2004 Japan Academy Award
2005 The Order of the Sacred Treasure, Gold Rays with Neck Ribbon
2009 Paul Karrer Gold Medal, Switzerland
2009 Hokkaido Shimbun Cultural Award
2010 The Order of Culture
2010 Nobel Prize in Chemistry
2011 H.C. Brown Award for Creative Research in Synthetic Methods

Born in 1930

1959
Research Assistant, School of Science, Hokkaido University

1960
Ph.D. in Chemistry, Graduate School of Science, Hokkaido University

1961
Associate Professor, Faculty of Engineering, Hokkaido University

1963
Postdoctoral Fellow, Purdue University, U.S.A.

1973
Professor, Faculty of Engineering, Hokkaido University

1988
Visiting Professor, University of Wales, U.K.

1994
Emeritus Professor, Hokkaido University Professor, Okayama University of Science, Japan
Professor, Kurashiki University of Science and the Arts, Japan
Visiting Professor, Purdue University, U.S.A. and National Taiwan University, Taiwan

2006
Distinguished Professor, Graduate School of Engineering, Hokkaido University

2010 Nobel Prize in Chemistry

2019
CDW Group - Inauguration as honorary research director

Tadakatsu Mandai

Awards

1985 The Chemical Society of Japan
Progress Award

1990 The Society of Synthetic Organic Chemistry
Japan Research Planning Award

Born in 1951

1979
Research Assistant, Faculty of Science,
Okayama University of Science

1980
Senior Lecturer, Faculty of Science,
Okayama University of Science

1985
Associate Professor, Faculty of Engineering,
Okayama University of Science

1985~86
Visiting Researcher, Cornell University, U.S.A.

1994
Professor, Faculty of Engineering,
Okayama University of Science

1995
Professor, Faculty of Industrial Research Institute,
Kurashiki University of Science and the Arts

2004
Professor, Faculty of Life Science,
Kurashiki University of Science and the Arts

2019
Professor emeritus,
Kurashiki University of Science and the Arts

2019
CDW Laboratory - Inauguration as research director

Hideo Tanaka

Awards

1985 Incentive Award in Synthetic Organic Chemistry, Japan

1995 The Chemical Society of Japan Technology Award

1999 Uchiyama Yuzo Science and Technology Award

2015 Achievement Award of the Organic Electron Transfer Science Study Group

Born in 1945

1968
Research Assistant, Faculty of Engineering, Okayama University

1984
Associate Professor, Faculty of Engineering, Okayama University

1988
In charge of Graduate School of Natural Science and Technology, Okayama University

1997
Visiting Professor of Paris 6th University

2002
Professor, Faculty of Engineering, Okayama University

2005
Professor, Graduate School of Natural Science and Technology, Okayama University

2010
Contract Professor, Graduate School of Natural Science and Technology, Okayama University

2016
Part-Time Lecture, Faculty of Engineering, Okayama University

2019
CDW Laboratory - Inauguration as advisor

ジェネリック医薬品の製造販売
Manufacturing and marketing of generic drugs

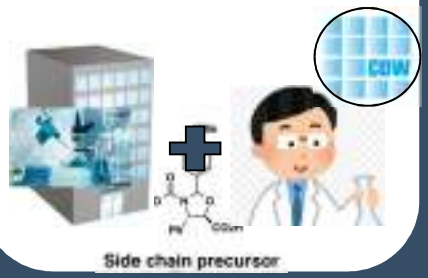
Currently searching for partners

【 Plan 】

- **Professor Mandai holds the patent for the method to produce the Side Chain Precursor of Paclitaxel/Docetaxel with low cost and high efficiency**
- **Paclitaxel/Docetaxel are key agents for anticancer drugs**
- **We have the right to license this production method to third-party manufacturers**
- **We are currently searching for partner companies**

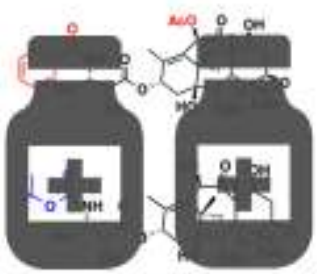
Procurement of raw materials

Side chain precursor production
Providing production technology guidance by patent technology



Side chain precursor

synthesis→marketing



Hiroki Hamada

Awards

1996 Incentive Award in Synthetic Organic Chemistry, Japan
2010 Uchiyama Yuzo Science and Technology Award
2011 Japanese Society for Plant Cell and Molecular Biology Technology Award
2016 Best Presentation Award

Born in 1952

1983
Basic Science Assistant, Faculty of Science, Okayama University of Science

1988
Researcher , Oklahoma State University

1989
Researcher , Texas A&M University

1992
Assistant Professor, Faculty of Science, Okayama University of Science

1998
Professor, Faculty of Science, Department of Basic Science , Okayama University of Science

2004
Professor, Faculty of Science Department of Life Science , Okayama University of Science

2018
Cooperative Research Agreement , Bangladesh Islamic University

2019
Cooperative Research Agreement , Sister Nivedita University, India

2019
CLS - Joint research ongoing

美容クリーム
Beauty Cream

Currently being tested in Korea

【 Plan 】

- Professor Hamada discovered *glycosylation of pterostilbene* (糖基化), a reaction known to minimize wrinkles and sagging of skin
- We have the patent in Japan and South Korea
- The effectiveness of this reaction is currently being tested in Korea
- We are currently searching for partners in Asia for production and sale

頭髪関連商品
Hair Care Products

Currently searching for partners

【 Plan 】

- ***Glycosylation of pterostilbene* (糖基化) is found to promote production of *Collagen XVII (COL17A1)*[1], a protein found to suppress hair loss and greying of hair**
- **We have the patent in Japan; application currently pending in South Korea**
- **We are currently planning to enter a partnership with a haircare-related company.**

※1: “Stem cell competition orchestrates skin homeostasis and ageing”, published on Nature on 3 April 2019

Micro-Nano Bubble in High Concentration

Together with Professor Ohdaira, an active surgeon and team leader in the Institute for Solid State Physics of Tokyo University, we are developing a device for sale in the medical field.

We plan to prepare a global sales strategy for commercializing this *Micro-Nano Bubble* device soon.

03

Micro-Nano Bubble

Takeshi Ohdaira

Awards

2003 European Association for Endoscopic Surgery (EAES) Best Technology
2006 European Association for Endoscopic Surgery (EAES) Best Technology
2010 European Association for Endoscopic Surgery (EAES) Best Technology
2011 European Association for Endoscopic Surgery (EAES) Best Technology
2013 TANKO-SURGERY ORG YAMAGATA AWARD

Born in 1964

2001
Professor, Training institute of Emergency Medicine & Critical Care

2007
Certified physician,
Japan Society for Endoscopic Surgery

2009
Senior Lecturer, Center for Integration of Advanced Medicine, Life Science and Innovative Technology, Kyushu University Hospital

2010
Associate Professor, Center for Integration of Advanced Medicine, Life Science and Innovative Technology, Kyushu University Hospital

2012
Representative Director,
Japan Micro-Nano Bubble Society Corporation

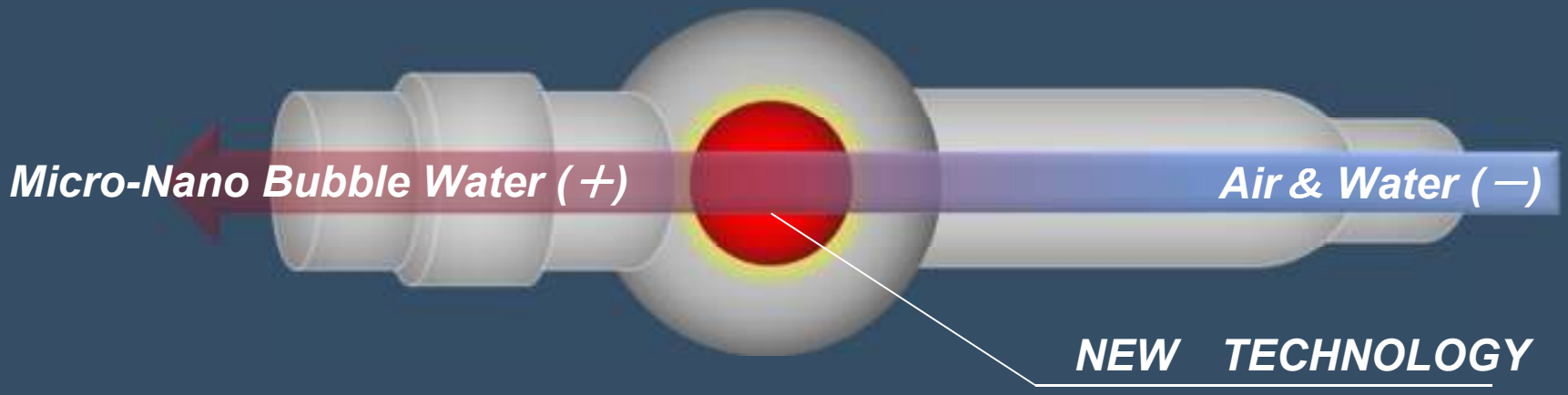
2014
Professor, Department of Advanced Medicine and Innovative Technology, Kyushu University

2018
Team Leader, The Institute for Solid State Physics
The University of Tokyo

2019
Professor, School of Pharmacy,
Kumamoto University

2019
Start of collaboration with our group

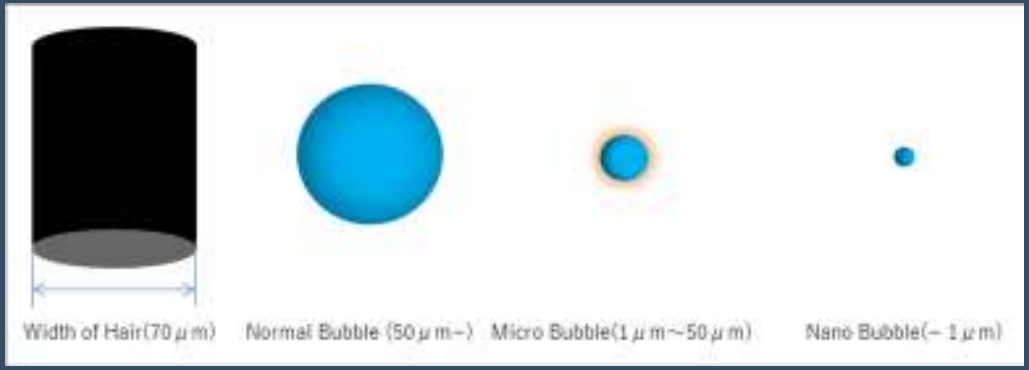
PLUS-Charged Micro-Nano Bubble

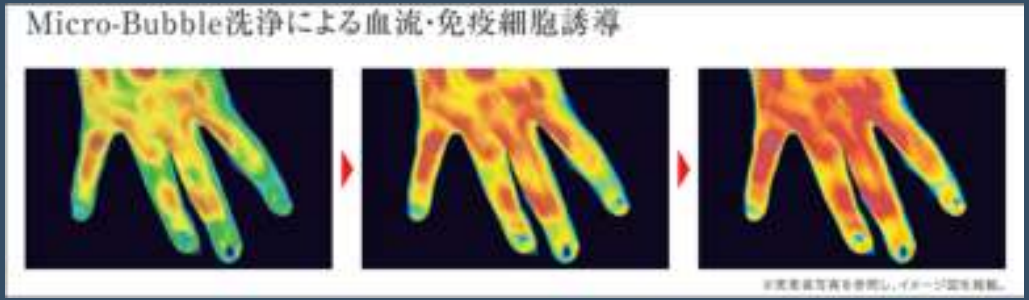


- Patent pending; PCT submitted
- Submitted request to update the International Standard for Fine Bubbles

※ The current standards (ISO20480(TC281)) does not specify the chargeability of the bubble

マイクロ・ナノバブル説明
Explanation of Micro and Nano Bubble





【What are Micro-Nano Bubbles?】

- Micro Bubbles are fine bubbles of 10 μm to 50 μm.
- Nano Bubbles are less than 1μ.

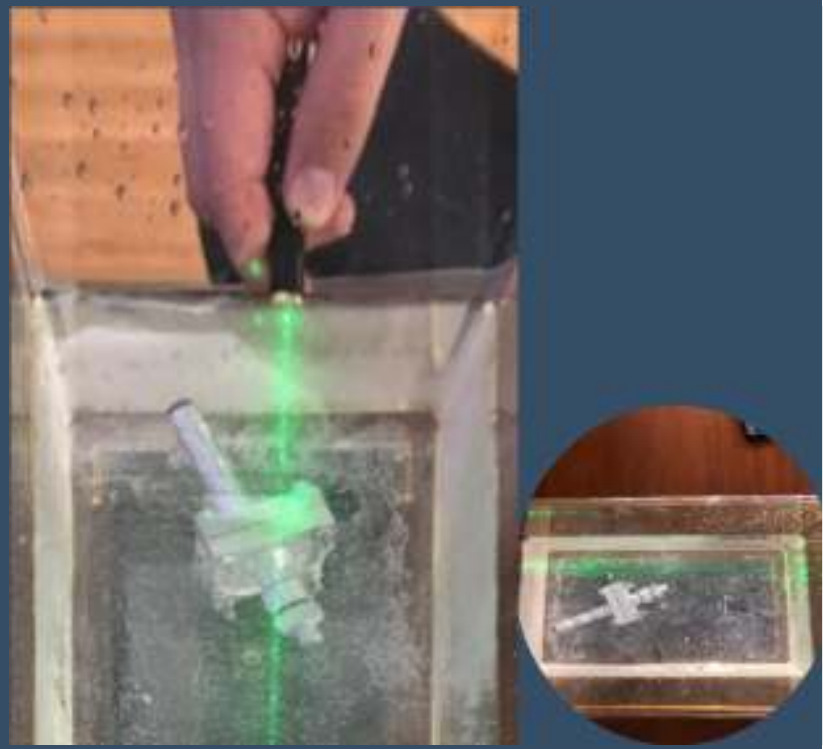
【 How does it work? 】

- The bubbles enter the skin and stimulate the capillaries.
- This process removes debris and increases blood flow.

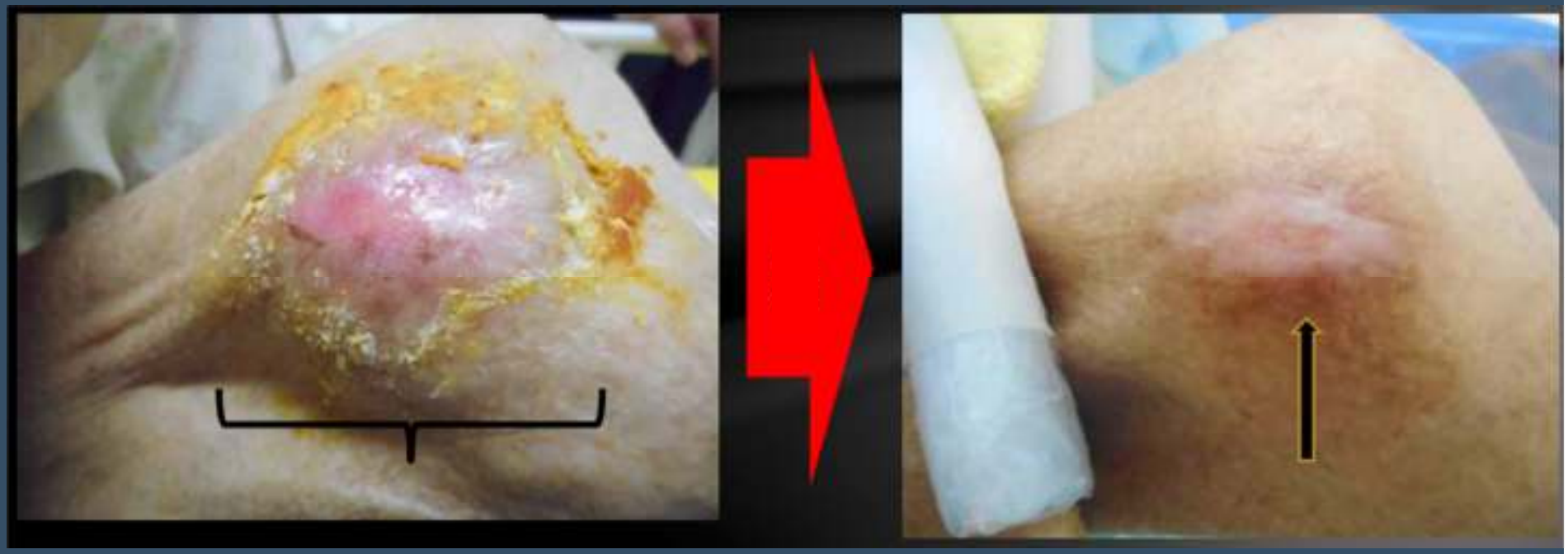
マイクロ・ナノバブル説明
Explanation of Micro-Nano Bubbles

【Absence of Micro-Nano Bubbles】

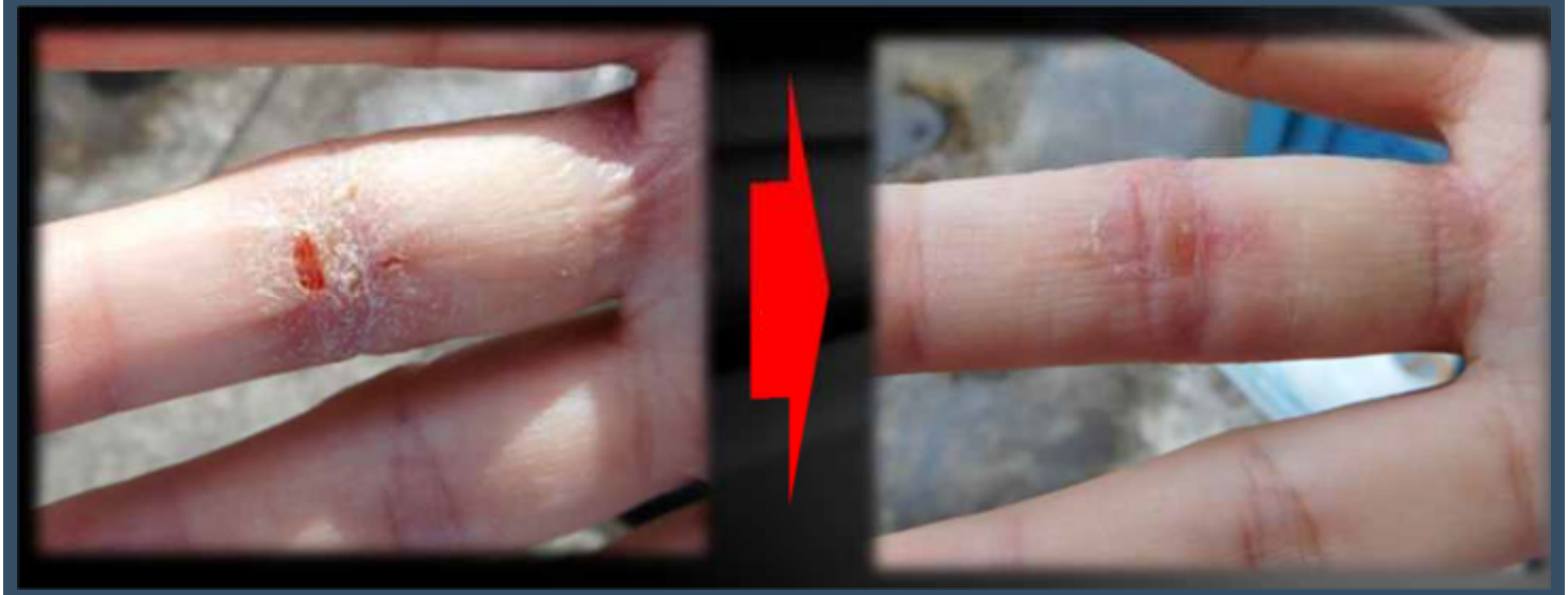
【Presence of Micro-Nano Bubbles】



Example ①



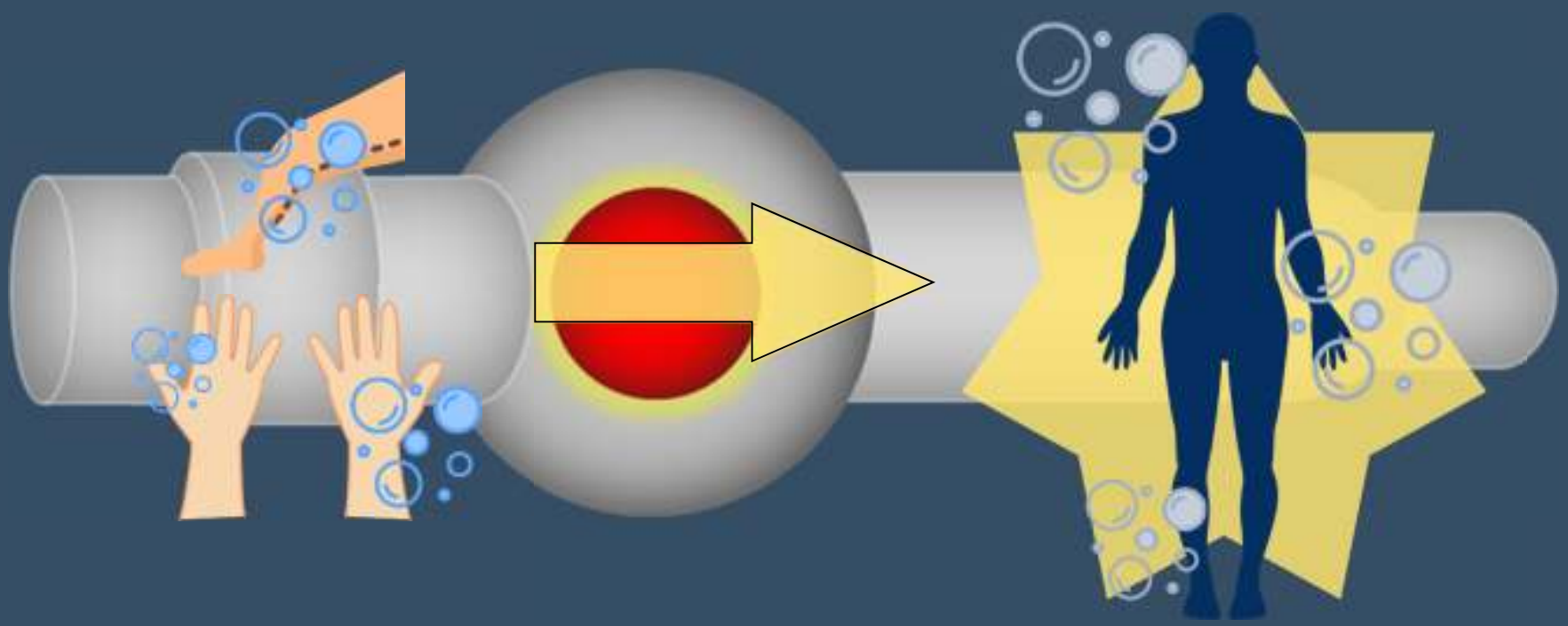
Example ②



ビジョン
Vision

OUR VISION

To build a *Full-Body System* derived from our current model



THANK YOU