



For Immediate Release

July 23, 2019

Aroma Bit, Inc.

Toyohashi University of Technology
Toyohashi Sensor Kyogikai Corporation
Hamamatsu Photonics K.K.
Toho Technology Corporation
Nippon Chemi-con Corporation

Aroma Bit to Develop Smartphone Embeddable Ultra-compact Silicon CMOS Based Smell Sensor That Has Dog Nose Equivalent Resolution in 1mm Squared Die Size

– Launching a new subsidiary certified as Toyohashi University of Technology’s first university-launched venture company–

Aroma Bit launched a new subsidiary to develop the next generation smell sensor based on silicon CMOS sensor substrate that are ultra-compact, high resolution and low cost. The technology is realized by applying Aroma Bit developed smell sensor receptor membrane technology to ultra-sensitive silicon CMOS based ion imaging sensor technology developed by professor Kazuaki Sawada at Toyohashi University of Technology and associated companies.

Aroma Bit: <http://www.aromabit.com>

Realizing smartphone embeddable smell sensor with dog nose equivalent ultra-high resolution smell sensor on only 1 millimeter square silicon die size

Aroma Bit has developed and are currently selling a compact smell sensor that employs QCM or Quartz Crystal Microbalance type sensor substrate, which demonstrates ultra-high sensitivity in the sensor market. However, further size reduction, cost reduction to meet

high volume application market, such as smartphone, was challenging with conventional QCM type smell sensor.

With the newly developed silicon CMOS type smell sensor, ultra-compact, high smell resolution and low cost can be realized, to be embedded to system such as smartphone or IoT devices. For instance, it is expected that resolution equivalent to dog nose's resolution (roughly 1,200 receptors) within 1mm die size can be achieved using the new type of sensor substrate.

With new addition of sensor substrate technology, Aroma Bit now holds two types of sensor substrate technology line up: (1) conventional and yet ultra-high sensitivity QCM type sensor substrate technology, and (2) ultra-high resolution, ultra-compact, low cost silicon CMOS type sensor substrate technology. Combined, highly competitive sensor technology portfolio is realized in two key performance for smell sensor, namely, sensor sensitivity and smell resolution. As a result, the addition of the new sensor is expected to further enhances Aroma Bit's technology competitive advantage against its competitors in the compact smell sensor space.

Silicon CMOS Sensor type Smell Sensor Element Realize

- 1 millimeter square silicon die size containing dog-nose equivalent ultra-high resolution smell sensor

- ◆ 1mm square



Resolution equivalent to dog nose's resolution (1,200 receptors)

* man (about 400)

- Ultra-compact, cost efficient resolution to embed in smartphone or IoT



aroma bit

Chart1: With the new developed silicon CMOS type smell sensor, ultra-compact, low-cost, high smell resolution smeller, embeddable to smartphone or IoT devices can be realized

Aroma Bit is currently also accelerating its development of digital smell database or smell big-data based on its hardware competitive advantage. Sensor hardware and smell database together, Aroma Bit is committed to retain its top-position in growing digital olfactory market, thereby realizing Aroma Bit's vision "to realize a better world by visualizing the world of smell/aroma through odor imaging technology."

Aroma Bit Smell Sensor Element

Embeddable to smartphone, containing dog-nose equivalent ultra high resolution smell sensor can be realized.



Chart 2: Comparison of the Odor Sensor elements of Aroma Bit(QCM type and the silicon CMOS type released now)

New subsidiary certified as the first Toyohashi University of Technology University-Launched Venture Company

The new developed subsidiary, Aroma Bit Silicon Sensor Technology, Inc., is certified as the first Toyohashi University of Technology certified University-Launched Venture Company.

While University-Launched Venture company is on the rise in Japan, there is limited successful case leading to industrialization, due to factors such as lack of intellectual property conflict among large companies interest, skill set mismatch on researcher as entrepreneurs, among others.

In this particular Industry-academia collaboration case, the chance to commercialize technology is expected to increase by assigning venture company a role to drive business development of the technology developed jointly with university.

Background:

Aroma Bit succeeded in developing next generation smell sensor based on silicon CMOS sensor substrate that are ultra-compact and high resolution by applying Aroma Bit developed smell sensor receptor membrane technology to ultra-sensitive silicon CMOS based ion imaging sensor technology developed by professor Kazuaki Sawada at Toyohashi University of Technology.

In 2017, Toyohashi Technology of University, Toyohashi Sensor Kyogikai Corporation, Hamamatsu Photonics K.K., Toho Technology Corporation, Nippon Chemi-con Corporation and Aroma Bit together formed private Consortium COSCo (CMOS Odor Sensor Consortium). In 2018, COSCo consortium released working prototypes such as Kaori-Camera (Aroma Camera) and i-sniffer.

In the interest to aggregate the achievement from COSCo consortium and further accelerate development and industrialization, Aroma Bit Silicon Sensor Technology, Inc. (Hereafter, “ABSST”) is founded as Aroma Bit’s subsidiary.

Going forward, ABSST is committed to develop the silicon CMOS type next generation smell sensor that are ultra-high resolution, ultra-compact and low-cost embeddable to smartphone and IoT Devices.

New Subsidiary Company Profile

Name of company:	Aroma Bit Silicon Sensor Technology Inc. (ABSST)
Date of Registration:	June 28th, 2019
Paid-in-Capital:	10 Million JPY [Aroma Bit, Inc. Subsidiary]
Business Profile:	Planning, Development, Manufacturing and Sales of silicon CMOS based next generation smell, gas sensor, and other related business
Representative Management:	Representative Director & CEO Shunichiro Kuroki [Current Representative Director & CEO of Aroma Bit, Inc.]

Address: E205 KSP 3-2-1 Sakado, Takatsu-ku, Kawasaki-city, Kanagawa
213-0012 [Aroma Bit Kawasaki Lab]
Corporate URL: www.aromabitsst.com
Contact: Email: info@aromabitsst.com
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Chart3: Summary of Aroma Bit Silicon Sensor Technology, Inc.



Chart4: Picture of 1mm squared die of silicon CMOS based smell sensor, with dog nose equivalent ~1,200 sensor pixels

About Aroma Bit

Aroma Bit develops, produces and sells electronic equipments and systems including compact odor imaging sensors.

[Corporate summary]

Name: Aroma Bit, Inc.

Address: Sagami Building 2F 7-13-6 Ginza, Chuo-ku, Tokyo

Representative: Representative Director & CEO Sunichiro Kuroki

Established: February, 2014

Business:

- Development, Production and Sales of electronic equipments and systems including compact odor imaging sensors.
- Development, Production and Sales of innovative services using the Sensor products.
- Other business related to the above.

Corporate

URL: www.aromabit.com

Contacts

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