



A Global Innovator of IT & BT

2019

CONTENTS

COMPANY OVERVIEW	Corporate Identity Vision Core Value Company Overview Company History
CHIP DESIGN	Business of Chip design Service Business Model Partners & Business area IR Receiver Business Pluschip
THERMAL COMPOUND	Business of Alpha materials Thermal Compound Product Performance & Comparison Production plant
COLOR SOLAR WALL (CSW)	Business Overview Application Case of CSW
BIO-PHARM	Oncosec Inc.

CORPORATE IDENTITY

Alpha Holdings is No.1 semiconductor design service and chip design specialized company in Korea and running semiconductor product development, mass production, and technical support business with the orders from domestic and overseas system semiconductor and set manufacturers. Through partner contract with comprehensive semiconductor company, Samsung Electronics, we supply the finished system semiconductor products to fabless companies. Alpha Holdings has carried out many developments and mass production projects based on semiconductor design, development specialized manpower, micro processing technology and semiconductor development of the largest scale in Korea for each application area, and we have secured unrivaled position.

VISION

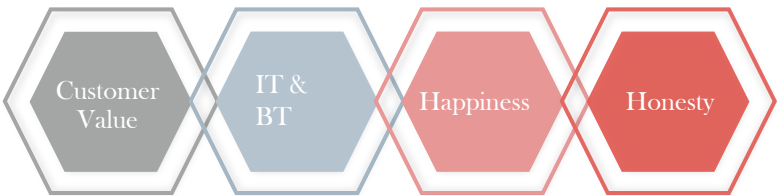
We plan to become a leading company in Global IT & BT Innovator and Convergence field based on the best skill and honesty with the first priority in customer value, to make a company where all of the customers and employees being happy.

A Global innovator of BT & IT

IT & BT CONVERGENCE

Alpha Holdings is a company to create added value in human health improvement, disease prevention, diagnosis, and treatment through the convergence of **IT and BT**.

We are growing by creating new market combining IT and BT.



CORE VALUE

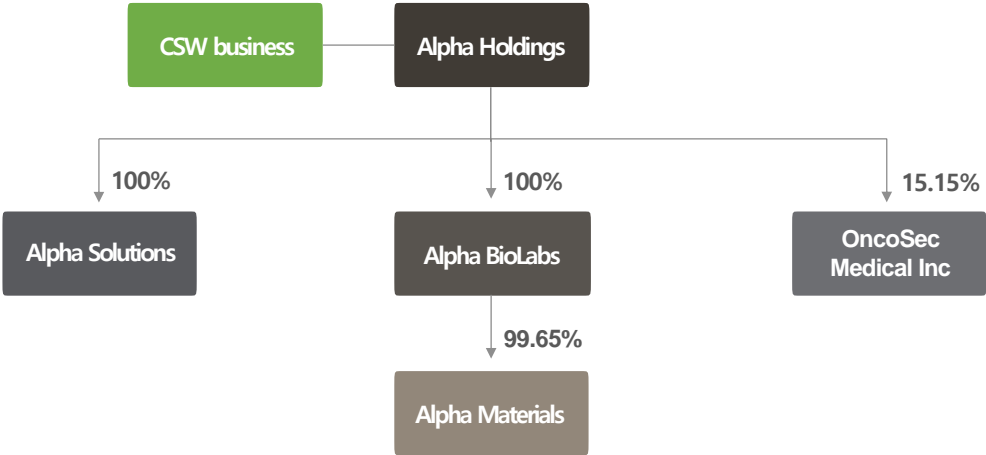
Core value

Customer value oriented	We will continuously try to preemptively provide solutions for customer needs and market change and to create value in the standpoint of the customers. We will reinforce the communication with the customers to increase the value.
Best IT&BT Convergence capacity	In the semiconductor sector, we will secure IP, SOC solution, and service capacity suitable for the fleet process and characteristics in advance, and in the bio sector, we will secure development / production / sales capacity through affiliation with domestic and overseas new drug specialized companies. Also, we will create new market combining IT and BT to contribute to the human society.
Happy company	There are a lot of people wanting various types of happiness. Our goal is to provide good quality products and services in the workplace where our members take care each other like a family, so that the customers will also be happy.
Truth and honesty	We will make the company environment that all of the employees can always face the colleagues and customers with honesty and truth. So, we will become a company consistent from the beginning until the end.

COMPANY PROFILE

Company Name	Alpha Holdings Co., Ltd. (KOSDAQ;117670)
CEO	Kim, young sun / Koo, Hee DO
Date of establishment	November 2002
Capital	7.1 billion KRW (As of June 2019)
Number of employees	102 (As of June 2019)
Location	Main office : 8th floor, 344, Pangyo-ro, Bundang-gu, Seongnam-si, Gyeonggi-do, Republic of Korea (Sampyeong-dong, Smile Gate campus) Seoul office : 17-10, Apgujeong-ro 62-gil, Gangnam-gu, Seoul, Republic of Korea Cheongju Office : 1360, Garosu-ro, Heungdeok-gu, Cheongju-si, Chungcheongbuk-do, Republic of Korea
Homepage	www.alpha-holdings.co.kr

EQUITY STRUCTURE





About Alpha Holdings

History

2019.10 Enter Into Color Solar Wall(CSW) business
 2019.09 Merged With Plus Chip CO., Ltd
 2019.05 Acquisition of share of Plus Chip CO., Ltd
 2018.10 Merged With ADTECH CO., Ltd
 2018.10 Acquisition of share of ADTECH CO., Ltd
 2018.09 Acquisition of share of USA ONCOSEC MEDICAL INCORPORATED
 2018.09 10nm Project development completed
 2018.01 Registered supplier of CHN BYD AUTO CO., LTD
 2017.12 14nm Project development completed
 2016.11 ALPHA-MATERIALS Co., Ltd. established
 2016.10 Alpha Solutions Co., Ltd. physical division
 2016.08 Alpha Bio Labs Co., Ltd. established
 2016.08 Bi business added to business purpose
 2016.08 Company name changed to Alpha Holdings Co., Ltd.

Soaring of dream

(Currently in 2019)



2015.02 MHL2.0 Tx FHD Chip development completed
 2014.12 28nm HDMI IP development completed
 2014.07 65nm HDMI 2.0 RX IP development completed
 2014.05 Level-0 product 1st Silicon Pass(28nm)
 2013.08 28nm project 1st Silicon Pass achieved
 2013.02 Flash Memory Controller development completed
 2012.12 Level-0 product 1st Silicon Pass(45nm)
 2012.12 65nm HDMI1.4 Rx IP development completed
 2011.03 45nm Analog IP 4 types development completed
 2010.09 Listed in Korea KOSDAQ market
 2010.07 Network Camera joint design completed
 2010.05 45nm project 1st Silicon Pass achieved
 2010.05 Selected as Star Company Fostering Project [Seongnam-si]

Growth and Innovation

(2010 ~ 2015)



2009.11 Received Minister of Ministry of Knowledge Economy Citation in Talent Technology Competition
 2007.01 Received Outstanding Partner Company award from Samsung Electronics Co., Ltd.
 2006.04 ARM Platform based SoC design completed
 2005.11 Obtained 5 patents
 2005.09 ARM Peripherals design completed
 2005.05 90nm project 1st Silicon Pass achieved
 2004.05 Became member of Korea Semiconductor Industry Association
 2004.01 Started ASIC/SoC sales in Korea
 2003.12 Venture company certification
 2003.05 Alpha Chips Co., Ltd. subsidiary R&D center established
 2003.04 Samsung Venture Investment Co., Ltd. joint investment contract
 2003.01 Designated as Samsung Electronics Co., Ltd. Design Partner
 2002.11 Alpha Chips Co., Ltd. established

New Challenge

(2002 ~ 2006)



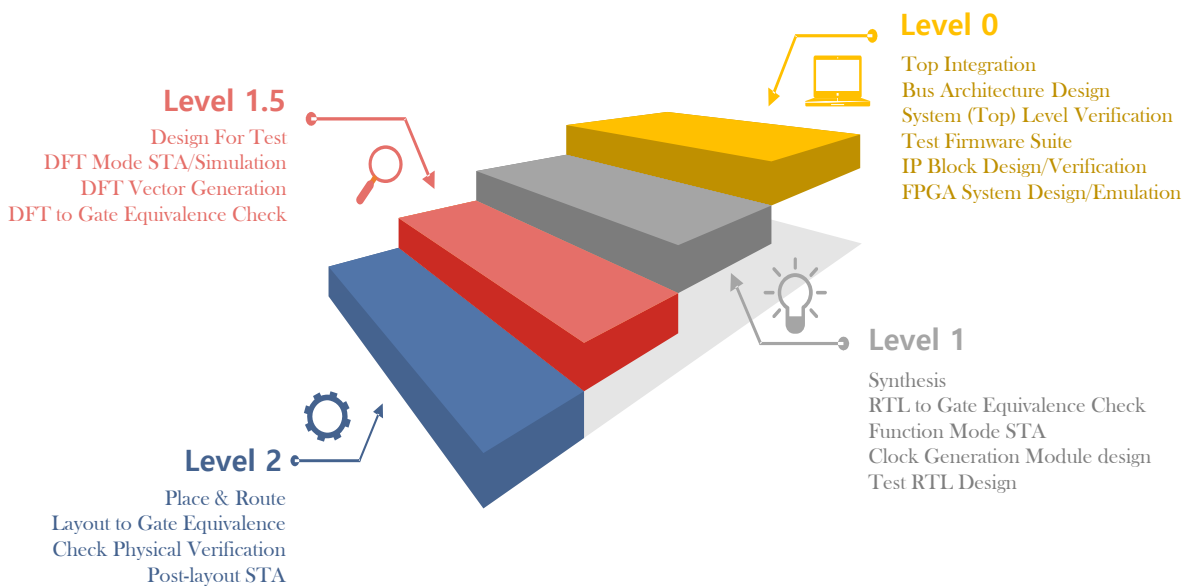


“Be
a global
innovator of
IT and BT”

Business of Chip design Service

No. 1 semiconductor design service and chip design company in Korea

Alpha Holdings



Alpha Holdings : Samsung Electronics semiconductor design service partner

Since selected as the only official Samsung Electronics semiconductor design service partner in 2003, we have been upgrading design and development know-how according to the fine process of Samsung Electronics semiconductor foundry. Afterwards, we successfully completed development and mass production project for various processes (90nm ~ 28nm) according to the requirements of system semiconductor (fabless) and set manufacturers. As a result, semiconductor design business (individual) made profit for the last 10 years.

Strengths: Securing fine process technology

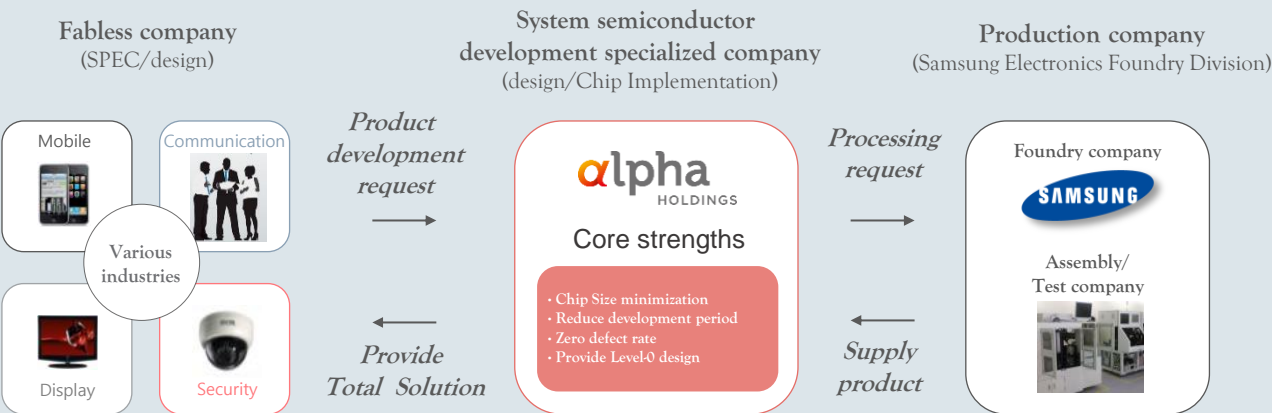
Alpha Holdings started fine process, 14nm FinFET process based product development project for high performance and low power semiconductor mass production in 2017, and when the client products are mass produced from 2018, we will secure the first 14nm mass production capacity in the industry and form high market entry barriers with it.

Performing Various Projects from level 0 to mass production

Alpha Holdings has about 100 best semiconductor design / development specialized manpower in the industry, and as we won the order of high level / high profit Level 0 project requiring customized semiconductor planning and design capacity (similar to ODM business model in terms of the manufacturing industry standard) from 2012, we became the only semiconductor design service specialized company that can carry out design · development · mass production turn-key project in Korea.

Business Model

Providing “Total Solution” from semiconductor design · development to production and mass production



Alpha Holdings is ready to support Samsung Foundry’s ASIC customers more effective way based on long-term collaboration with Samsung Foundry and competencies – leading edge process experiences, customer specific IP, high quality manpower, error free design, capabilities, etc



The SAFE program ensures deep collaboration between the Samsung Foundry, ecosystem partners, and customers to deliver competitive and robust System on Chip (SoC) designs based on certified key design components including Process Design Kit (PDK), reference flows with Design Methodologies(DM), Intellectual Property (IP), and ASIC design support.

Partner & Business area

Region

Industry

Korea



Foundry Business
 VD Business
 Mobile Communications Business
 Networks Business
 Samsung Printing Solution
 Samsung Display
 Samsung Advanced Institute of Technology



TeleChips

NEXELL

Overseas



GCT

SONY



Growing

- Multimedia
- Security
- Communication
- Display

+

New Entry



AR / VR



Car

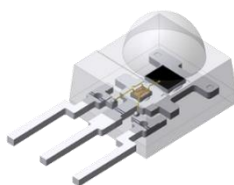




IR Receiver Business Outline

Date of establishment	September 1998
Number of employees	33 (As of November 2018)
Facility	IR Receiver IC used for infrared-ray communication Remote control signals are amplified and the Logic signal is transmitted to the MCU
Application	Appliances(TV, Audio, air-conditions etc.) & Computer, etc.
Key account	Domestic (Sales 20%) : Raytron, OPTP ELECTRONICS Cop, lumicom Overseas (Sales 80%) : Goodtake, Everlight, Lanfeng, ChengQiang, Allbrite, Wanzhou
Market share	45%

IR Receiver



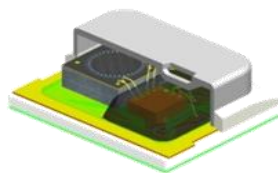
Function

IR Receiver IC used for infrared-ray communication. It amplifies the weak signal from the remote controller and transfers the logic signal to the MCU.

Application

Appliances(TV Set, VCR, DVD Player, Audio Component,Air Conditions, etc) & Toy & Computer, etc.

Mic. ROIC



Function

This converts the variable capacitance generated from the MEMS sensor for voice signal into an electrical signal and transmits it to the CODEC.

Application

Earphone
Smart Phone
Wearable Device
AI Speaker

Key Scan IC



Function

It is located on the rear panel of the Front panel of home appliances and drives the specific LED on the front panel using the information received from the key selected by the user.

Application

Washing machine
Refrigerator
Microwave

Alpha PlusChip

Design Service, SoC Turnkey Service
Specialized in ISP(Image Signal Process)

Company Name	Alpha PlusChip Co.,.ltd
Business	Design Service, SoC Turnkey Service
Date of establishment	April 2000
Employee	24 (As of June 2019)
Location	8th floor, 344, Pangyo-ro, Bundang-gu, Seongnam-si, Gyeonggi-do, Republic of Korea (Sampyeong-dong, Smile Gate campus)
Capital	500 million KRW

IP Design & Provider

- Pluschip provides Semiconductor IP including digital and analog IPs

Platform based Design service

- Provides platform-based design solution using Embedded Core
- ARM, Cortex M0/M3, MIPS...



Design Service

- Provides various design service
- Specification signoff
- RTL / Netlist / GDSII Handoff

SoC Turnkey Service

- One-Stop Service : ASIC Design Service from Design Specification to delivery of mass product

Business of Alpha-materials
(Thermal Compound)

Alpha-materials



AV-1 (AV-1000)

Thermal Compound

What is
Thermal Compound ?



- It is also called as TIM (Thermal Interface Material), Thermal Compound, Thermal Grease, or Thermal Paste
- Fluid material that transfers heat and helps discharge
- It has similar characteristics with oil, and it improves Thermal Conductivity in the contact part
- It is used to increase heat discharge efficiency of various machines and electronic parts

Compared to competing products, ALPHA-MATERIALS has

High

Thermal
Conductivity

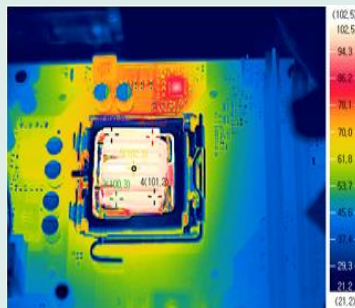
Low

Evaporation rate after applying
to product

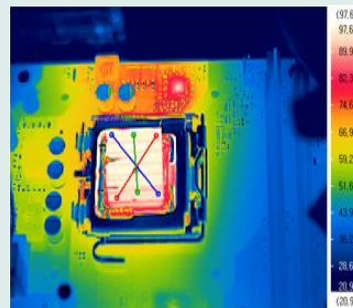
High

Cost
competitiveness

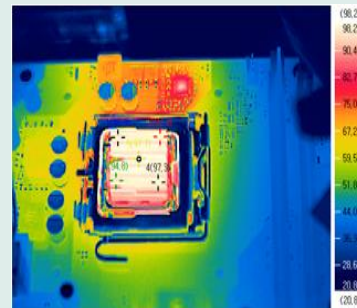
Thermal Compound
Developed and released



AV-1



MX-4



ZALMAN

Classification	Criteria	Zone 1	Zone 2	Zone 3	Zone 4	Zone 5
<u>AV-1(Korea)</u>	<u>Avg. temp. °C</u>	<u>100.2</u>	<u>101.6</u>	<u>100.3</u>	<u>101.2</u>	<u>102.3</u>
MX-4(Swiss)	Avg. temp. °C	96.8	96.7	94.5	94.7	97.2
ZALMAN(Korea)	Avg. temp. °C	96.9	97.3	94.8	97.3	97.7

Gumi Electronic Information Technology Center grade sheet issued
(※ As the temp. is higher, heat radiation effect is higher.)

Alpha materials

Thermal compound Business

Recently, thermal compound and technology that effectively process the heat generated from smart phone parts such as application processor (AP), PCB, etc. are receiving attention. As the smart phones are becoming thinner and higher performance, heat radiation related market demand is expected to increase fast. Alpha Holdings' subsidiary company ALPHA-MATERIALS developed core technology and secured related patent to solve the heat radiation issue from small size, thin, and multi function electronic devices, and developed and released Thermal Compound product (AV-1).

AV-1 is thermal material product with increased product lifespan and higher performance through heat radiation of mobile phone battery, various processors, EV motor, and LED lighting, etc., and it is environment friendly product without any chemical ingredient.

Application solution

Product (AV-1)

Use of application thermal paint

- Mobile devices (sprayed or applied to mobile phone heat radiation system and battery)
- Computer (sprayed to between CPU and cooler), Notebook (sprayed or applied to heat radiation system, battery, and CPU)
- Electronic devices
- LED lighting (sprayed to between lamp main unit and heat radiation plate)
- Ship-building (electronic parts, etc.)
- EV (sprayed to battery)
- Military products (military communication devices, etc.)
- Others (raw material for heat radiation pad, heat radiation film filler, etc.)



Features

- High heat radiation effect with minimum thickness
- Smooth heat discharge & heat spread
- Prevention of heat concentration in high heat radiation part
- Excellent viscosity
- No need for separate adhesive

ALPHA-MATERIALS product






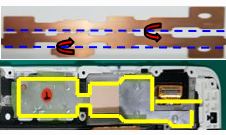
AV-Series

According to the request of the client, product performance (thermal conductivity, etc.) and property (viscosity, etc.) customizing is possible

Product	Thermal Conductivity (W/mK)
AV-100	2.53
AV-200	3.23
AV-300	3.81
AV-400	7.31



Product and Performance comparison

Product	Features	Image	Property	AV-400	Unit	Test method
Thermal grease 	Thermal conductivity improvement · 0.8~4W/mK Product · insulation propret · Maintaining fluid for long periods		Color	Light Gray	n/a	Visual
			Thermal conductivity	7.31	W/mK	ASTM D 5470
			Thermal resistance	0.72	m ² /KW	ASTM D 5470
			Specific gravity	2.75	g/ml	GP-300S
Thermal paint 	Diffusion of Thermal radiation, Vertical thermal diffusion · 1.2W/mK , 0.95 emissivity · UV hardening : Secure productivity · wider range of temperatures : -60~250℃		Viscosity	340	Pa.s	LVDV-E
			Dielectric Strength	3.7	KV/mm	RK2620AM,(25℃)
			Evaporative loss	Max. 0.01	wt%	KS M 2037
Heat spreader (AMHS series) 	More than a Heat Pipe with equivalent performance · Price advantage over than heat pipe · A variety of manufacturing methods		Oxidation rate	Max. 0.005	MPa	KS M 2049
			Temperature stability	-60 ~ +250	℃	n/a
			Bulk	Custom Sizes Available		n/a

- B2B product competitors are MX-4(Arctic), DOW Corning (U.S), Shin-Etsu(JPN) 등
 - ▶ We have the competency of longer materials hardening period within exposure to ai
- Cost effectiveness and high quality product compared to competitors'
- Vertical thermal conductivity 7.31W/mK more than DOW Corning and Shinetsu products. (KICET, ASTM Standard D5470)
- Started to apply Thermal Compound to global handset maker in 2H11 from 2017





Cost and quality advantages over competing products

With the current facilities, Alpha Materials are certified as ISO 9001, ISO 14001 and others. Alpha Materials has an infrastructure capable of producing up to three tons of work a day

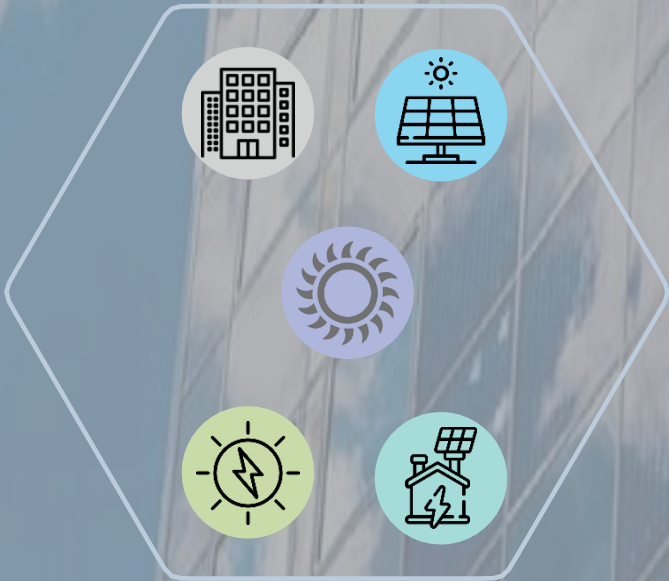


Manufacturing Plant




New Business

Color Solar Wall (CSW)

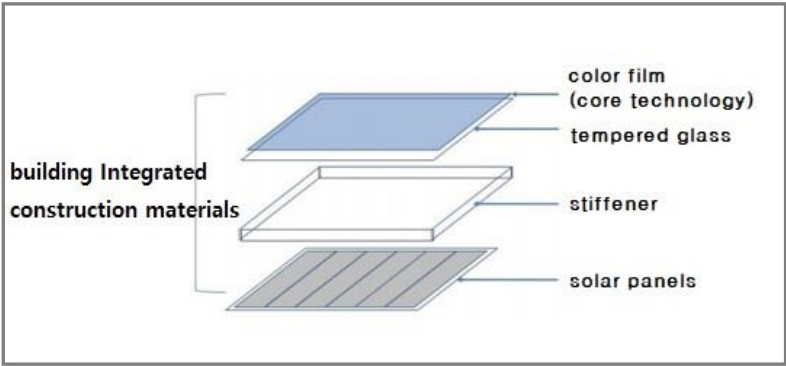


Acquisition a worldwide sole selling right for globally competitive CSW

OVERVIEW OF COLOR SOLAR WALL(CSW) BUSINESS

Business	Sales of color solar wall(building exterior materials)
Product	Photo Voltaic functional building exterior materials
Cooperative company	BJ Power
Contents	<div>✓ Acquisition a worldwide sole selling right for CSW produced by BJ Power</div> <div>✓ Establishment of JV, a Chinese conglomerate</div>
Characteristics	<div>Color coating process</div> <div></div> <div><ul style="list-style-type: none">• Application of color coating technology to replace expensive color glass• Multi-layered glass solar photovoltaic module with increased insulation and aesthetic effect• Possibility of custom order → produce various colors and power generation quantity according to customer's request• Increase transmissivity and diffuse transmittance by forming plastic ball in coated Layer → Increase a solar cell module's output</div>

CSW MODULE STRUCTURE



Create an air insulation layer inside the solar photovoltaic module and laminate colored resin on the outside of the solar cell

◆ SEOUL DONGDAEMUN DESIGN PLAZA



- Construction in 2012
- Zaha Hadid Architects are reflected in this design
- Gray color CSW is applied as roof external material

◆ POSCO DATA CENTER



- Construction in 2018
- Various colors are used to shape the QR code

◆ YG ENTERTAINMENT NEW OFFICE BUILDING



- Construction in 2019
- After featuring the YG logo, carry out the closing process by using CSW

Interleukin – 12





OncoSec Medical Incorporated is Developing candidates to stimulate anti-tumor immune response.



OncoSec Medical Inc.

Company Name	OncoSec Medical Inc
CEO	Daniel O'Connor
Newly Founded	2008
Location	San Diego, CA, US
employee	34
Identity	OncoSec is developing tavokinogene telseplasmid, a drug-device product combining IL-12 injection directly into the tumor via electroporation. Develops candidates to stimulate anti-tumor immune response.
Etc	- Collaborations : MERCK(MSD) Company (the US) - Major Platform : Immune Pulse system

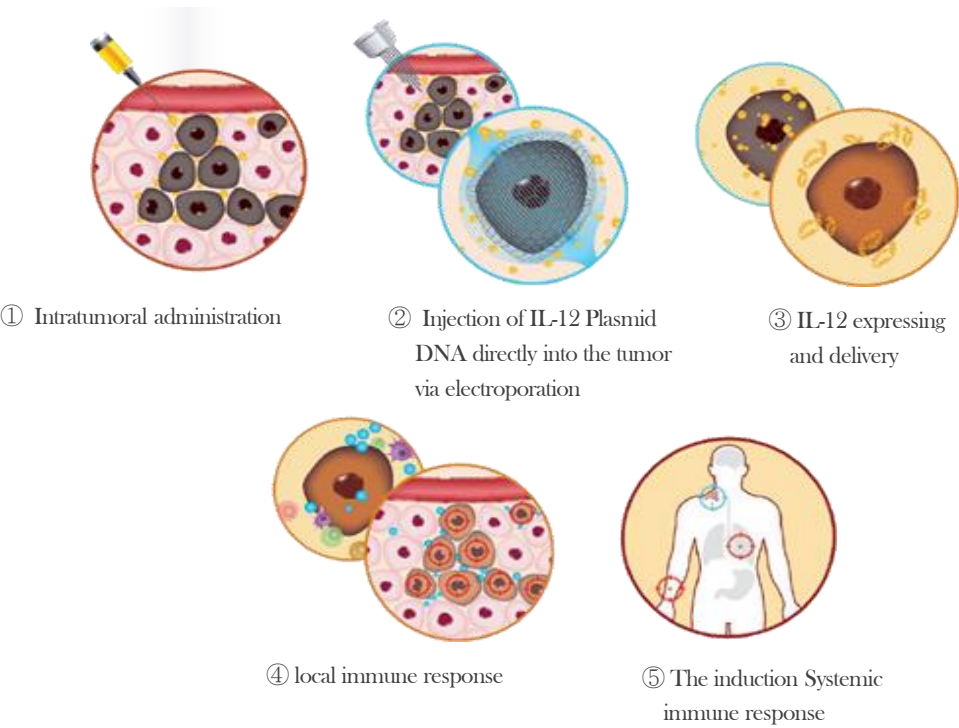
Management

Name	Position	Key work experience
Daniel O'Connor	CEO	<ul style="list-style-type: none">• President and CEO of Advaxis• Imclone Systems Senior Vice President• inVentiv Health (CRO)
Robert W. Ashworth, Ph.D	Vice President	<ul style="list-style-type: none">• contributions to the FDA approval of 12 new drugs.• Otsuka Pharma, Knoll Pharma (BASF)
Sara Bonstein	CFO	<ul style="list-style-type: none">• Eli Lilly• Johnson & Johnson
Christopher G. Twitty, Ph.D	CSO	<ul style="list-style-type: none">• Over 20 years of experience in tumor immunology• Bayer Pharma, Cell Genesys, Tocagen
Kellie Malloy Foerter	CDO	<ul style="list-style-type: none">• Syneos Health Senior Vice President• inVentiv Health
Robert Ward	Board of Directors	<ul style="list-style-type: none">• Radius Health CEO• AstraZeneca Vice President
Alain Algazi, M.D.	Clinical Advisory Board	<ul style="list-style-type: none">• UCSF Medical Center• National Comprehensive Cancer Network Panel

IMMUNOPULSE® IL-12

OncoSec’s lead candidate, tavokinogene telseplasmid (tavo), is differentiated for its ability to prime an immune response in tumors that would otherwise be unresponsive to checkpoint inhibitors.

Tavo is a drug-device product combining injection of IL-12 directly into the tumor via electroporation. Intratumoral administration has become a recognized strategy for cytokine therapy to exert local immune response and limit systemic toxicity. OncoSec’s proprietary ImmunoPulse device ensures successful gene transfer into tumor cells. These elements work in concert to deliver a potent and durable therapeutic effect that has also resulted in regression of untreated lesions, known as an “abscopal effect”.



IMMUNOPULSE®



- injection of IL-12 directly into the tumor via electroporation (EP).
- Available through a combination with other therapies.

OncoSec Pipeline



On-going Anticipated

Pipeline	Indications	Predinical	Phase I	Phase II	Note	Number
PISCES/ KEYNOTE -695	Melanoma 3/4				<ul style="list-style-type: none">Phase 2b Clinical trial in combination with Keytruda (MERCK) checkpoint inhibitor IL-12FDA Fast Track and Orphan Drug DesignationFor patients with pathological diagnosis of unresectable or metastatic melanoma who are progressing or have progressed on pembrolizumab.	NCT03132675
OMS-141 (KEYNOTE E-890)	Triple negative breast cancer				<ul style="list-style-type: none">A clinical collaboration with KeytrudaPatients enrollment from Nov 2018Phase 2b Clinical trial is expected in the Second half of 2019	NCT03567720
OMS-131	Head and neck squamous cell carcinoma				<ul style="list-style-type: none">A clinical collaboration with epacadostat, KeytrudaPatient enrollment completion and clinical data Present in the second half year	NCT03823131
OMS-150	Cervical cancer				<ul style="list-style-type: none">ImmunoPulse IL-12 within combination with KEYTRUDAPhase 2b Clinical trial is expected in the Second half of 2019Cooperation with Gynecologic Oncology Group (GOG) foundations	Anticipated

Contact

17-10, Apgujeong-ro 62-gil, Gangnam-gu, Seoul, Republic of Korea

Tel. +82. 2. 517. 8841

Fax. +82. 2. 6952. 8842

Home page. alpha-holdings.co.kr

