nepes
2022 INTRODUCTION

nepes

Semiconductor | Artificial Intelligence | IT Materials

ADVANCED
BACK-END
FOUNDRY

nepes' 4D management began at the very moment when the company name was chosen

From Hebrew | **נֶפֶשׁ(nephesh)**
Eternal Life / Dynamic
Longevity Corporation

4D(4th dimension) management?

The management that generate creation/innovation/ pioneering and fun/satisfaction/happiness
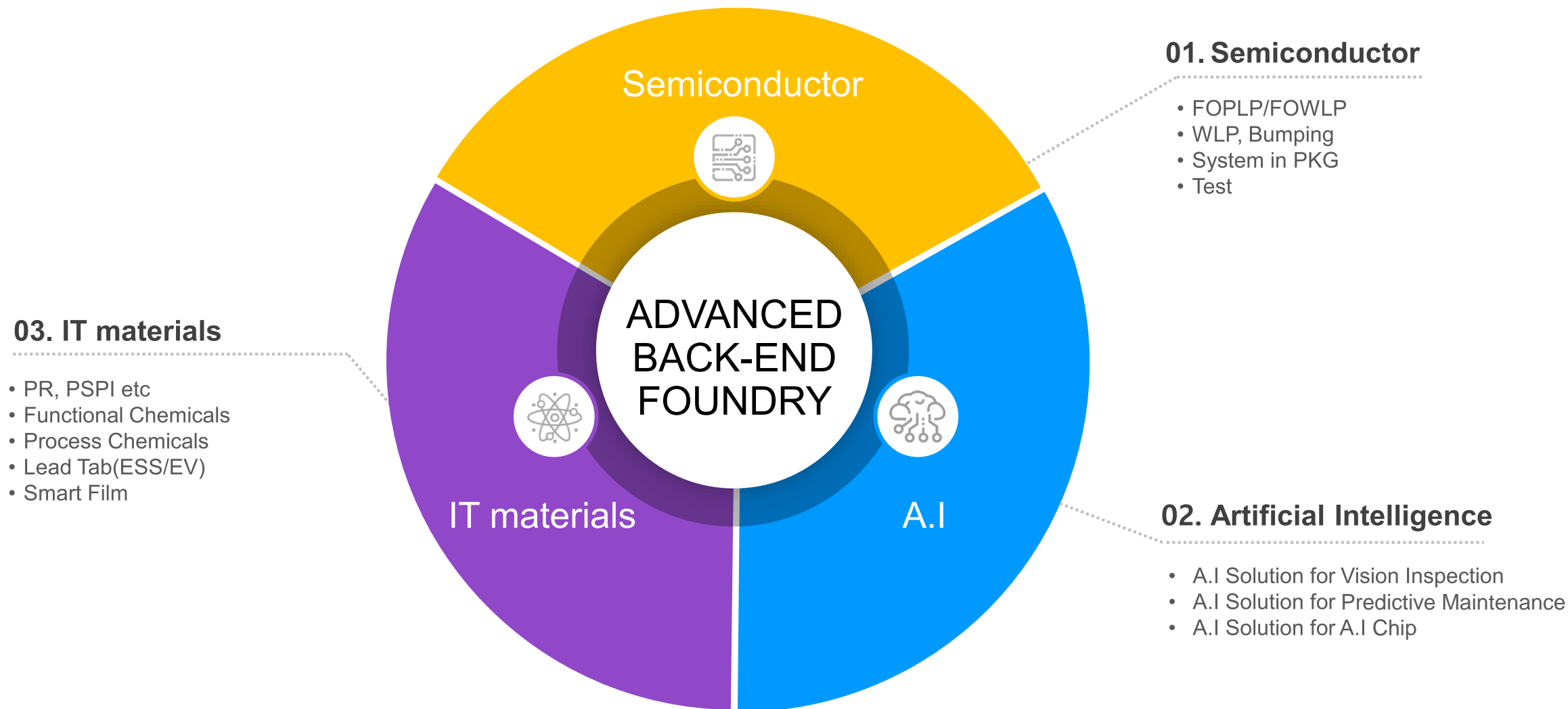
Corporate Identity

Trademark

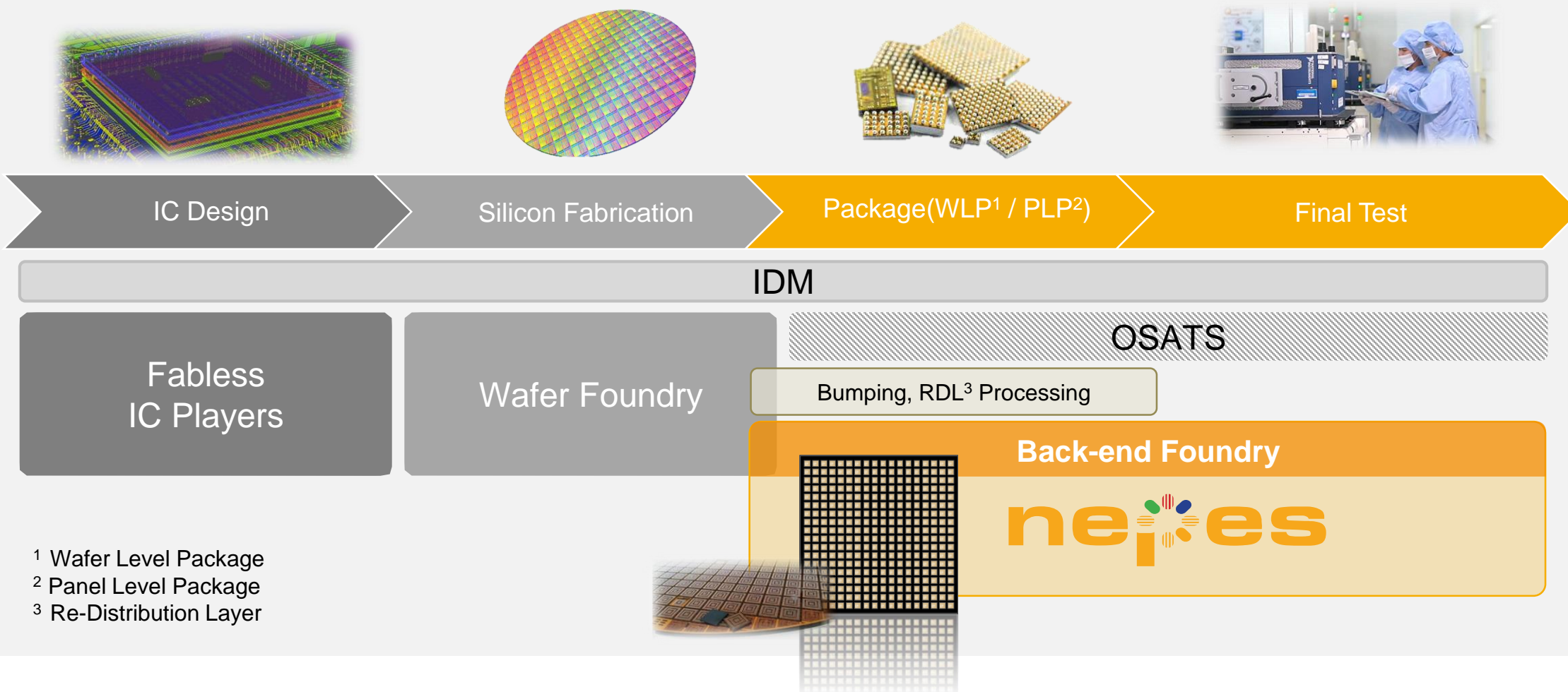| Name of company	nepes
Date of establishment	1990.12
Date of Listing	1999.12(KOSDAQ 033640)
CEO	Byung-Koo Lee(李柄九)
Overseas corporation	CN, US, PHL, IDN

BUSINESS PORTFOLIO

Advanced Back-end Foundry company nepes leads the future of system semiconductors

Semiconductor

ADVANCED BACK-END FOUNDRY

IT materials

A.I

01. Semiconductor

- FOPLP/FOWLP
- WLP, Bumping
- System in PKG
- Test

03. IT materials

- PR, PSPI etc
- Functional Chemicals
- Process Chemicals
- Lead Tab(ESS/EV)
- Smart Film

02. Artificial Intelligence

- A.I Solution for Vision Inspection
- A.I Solution for Predictive Maintenance
- A.I Solution for A.I Chip

nepes' advanced semiconductor technologies including FOPLP and nSiP changes global supply chain

Semiconductor Supply Chain

| IC Design | Silicon Fabrication | Package(WLP[1] / PLP[2]) | Final Test |

IDM

OSATS

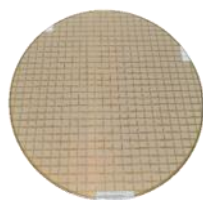| Fabless IC Players | Wafer Foundry | Bumping, RDL[3] Processing |

Back-end Foundry

nepes

[1] Wafer Level Package
[2] Panel Level Package
[3] Re-Distribution Layer

nepes' End-fab technology enables high-end semiconductor to be advanced and smaller
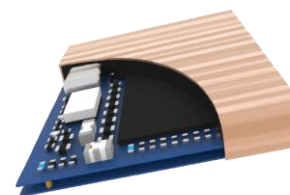
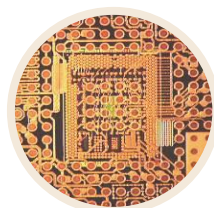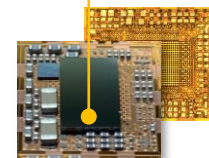| Fan in WLP	Fan out WLP/PLP	nSiP
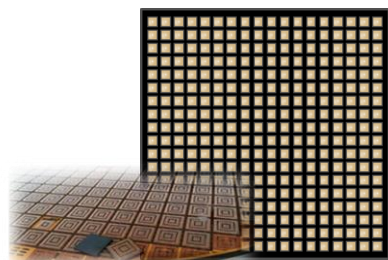
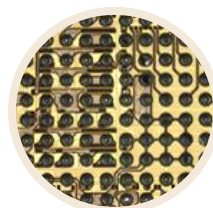
200mm / 300mm

300mm rd. / 600mm sq.

Small & Thin SiP(End fab+PLP)

0.4 mm

0.9 mm
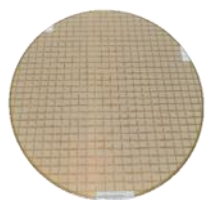

Applications

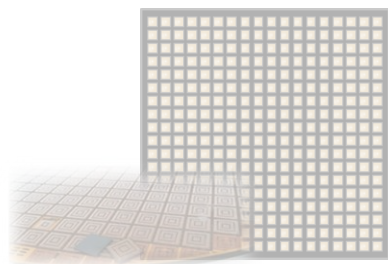5G

nepes' End-fab technology enables high-end semiconductor to be advanced and smaller
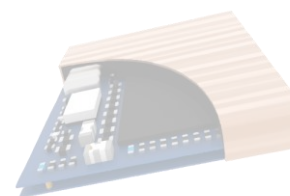
Fan in WLP	Fan out WLP/PLP	nSiP

Applications

200mm / 300mm   300mm rd. / 600mm sq.   Small & Thin SiP(End fab+PLP)

▶ **FIWLP(Fan in Wafer Level PKG) Process**
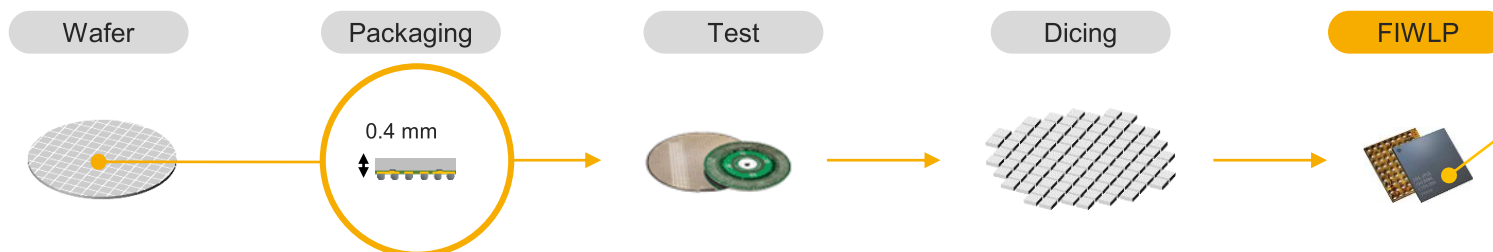
Wafer	Packaging	Test	Dicing	FIWLP

0.4 mm

5G

nepes' End-fab technology enables high-end semiconductor to be advanced and smaller

Fan in WLP	Fan out WLP/PLP	nSiP

200mm / 300mm

300mm rd. / 600mm sq.
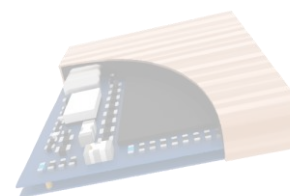
Small & Thin SiP(End fab+PLP)

Applications

▶ **FOPLP(Fan out Panel Level PKG) Process**
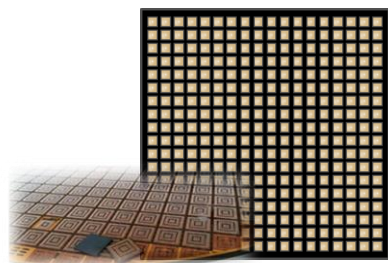
Panelization → Packaging (0.9 mm) → Test → Dicing → FOWLP / PLP

nepes' End-fab technology enables high-end semiconductor to be advanced and smaller

Fan in WLP	Fan out WLP/PLP	nSiP

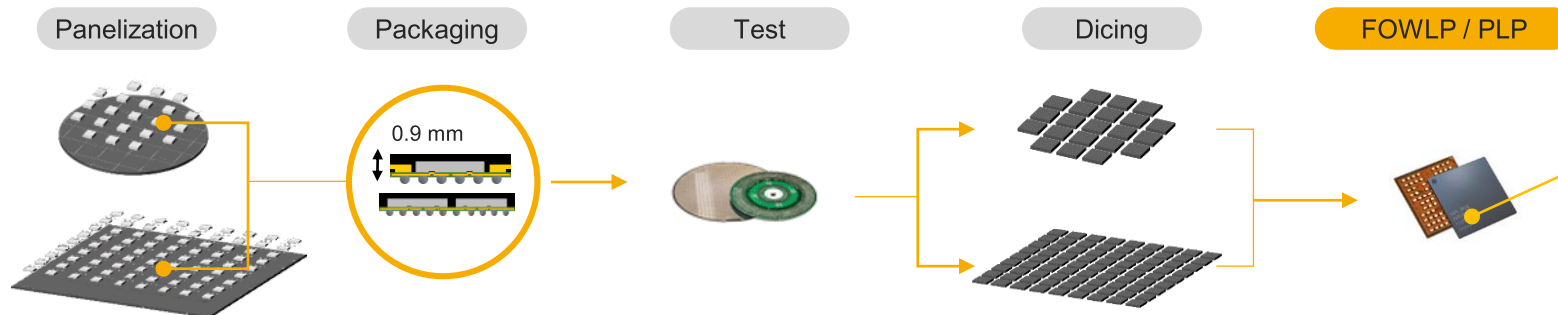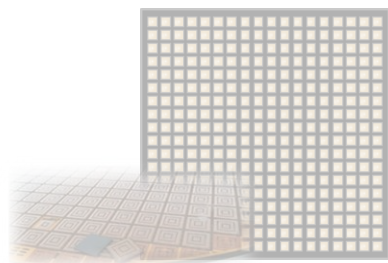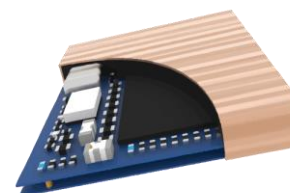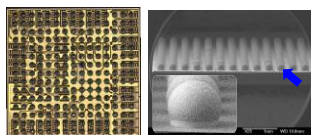200mm / 300mm

300mm rd. / 600mm sq.

Small & Thin SiP(End fab+PLP)

▶ What is nSiP(System in PKG)?

End-Fab Tech.

PLP Tech.

nSiP

Applications

5G

Process Automation

AI Chip

Vision Inspection
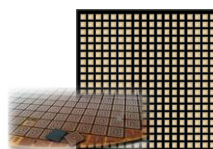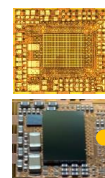
Predictive Maintenance

Service & Products

- A.I Solution for Vision Inspection
- A.I Solution for Predictive Maintenance
- A.I Solution for A.I chip

Process chemicals

- PR
- Developer
- Stripper
- Etchant
- HSN

Untreated

After treatment

PR Strip
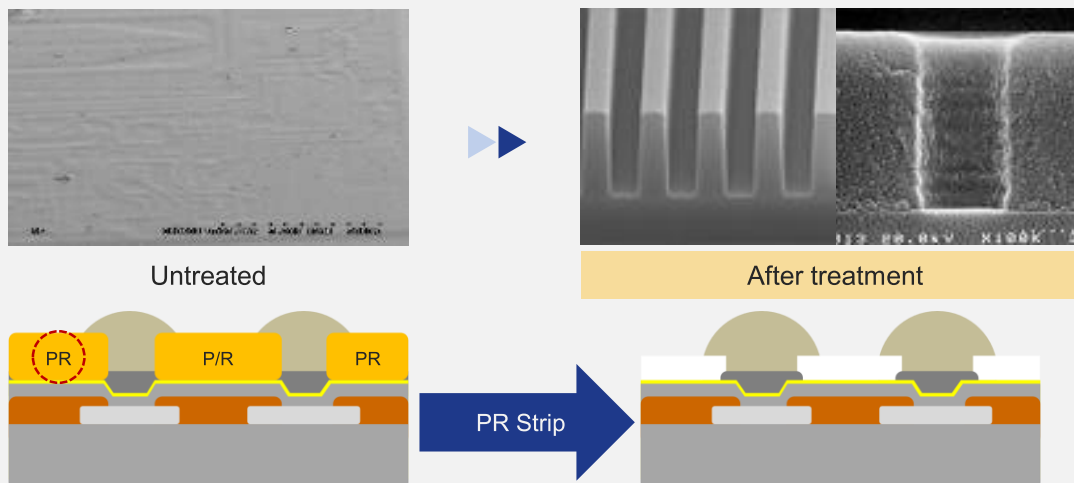
Functional chemicals

- ILD/PSPI
- Cu Plating
- Color paste

Redistribution layer(Cu)

Wafer

1st dielectric

2nd dielectric

Red   Green   Blue

ITO

Over coat

Black Matrix   Glass
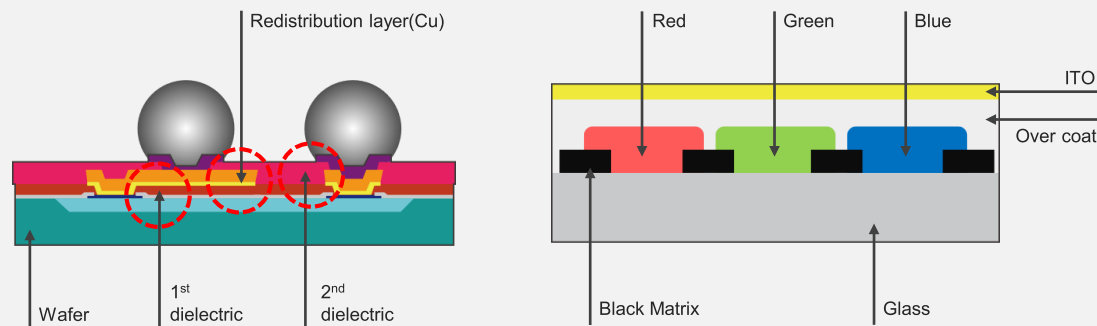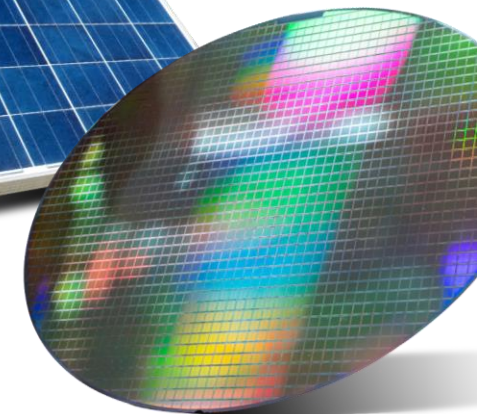
Applications

Semiconductor
Display(LCD, OLED)
Solar Cell

Lead Tab
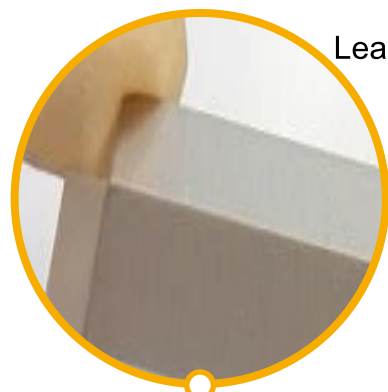
LIB anode electrode

Polymer
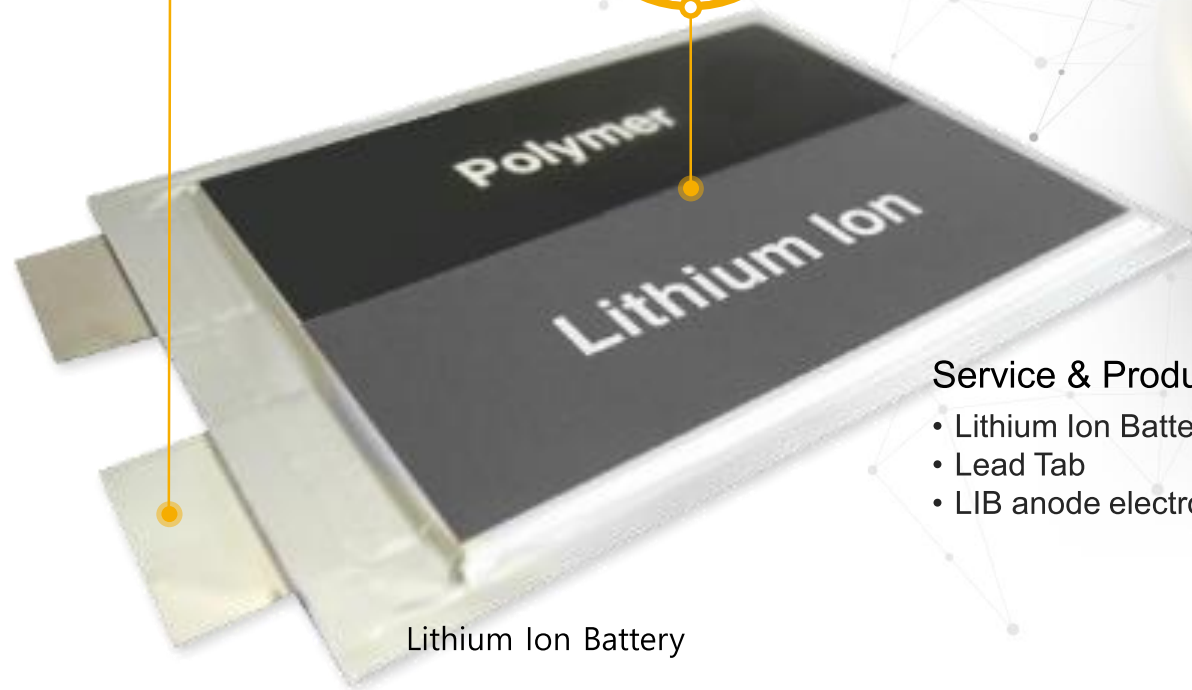
Lithium Ion

Lithium Ion Battery

Service & Products

- Lithium Ion Battery
- Lead Tab
- LIB anode electrode

Applications

PDLC(Super LC)

Signage application case

Super LC Structure and Principles

• PDLC (Polymer Dispersed Liquid Crystal)

Visible ray

LC ink
ITO
PET

POWER OFF   POWER ON
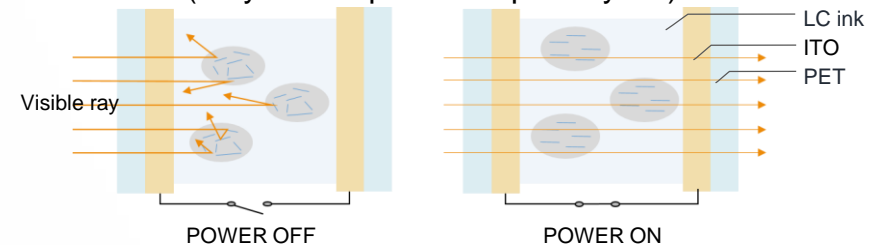
• PNLC (Polymer Network Liquid Crystal)

Visible ray

LC ink
Alignment layer
ITO
PET

POWER OFF   POWER ON
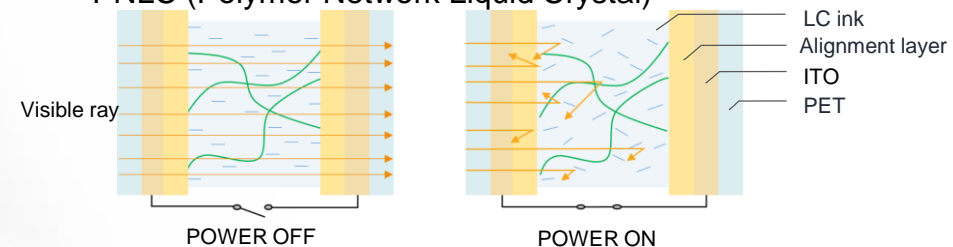
Service & Products
• Building & Interior
• Signage & Electronics
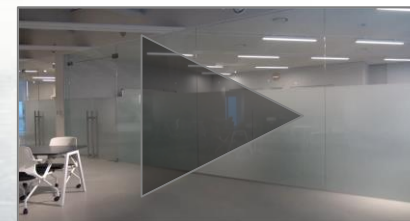
GLOBAL NEPES

We will serve the earth with our technology and products

nepes corp.

nepes Ark

nepes laweh

nepes yahad

nepes ENC

nepes hokmah

nepes US

Jiangsu nepes

nepes china

nepes japan

nepes hayyim

nepes abadi

- Semiconductor
- IT materials
- Artificial Intelligence
- Energy
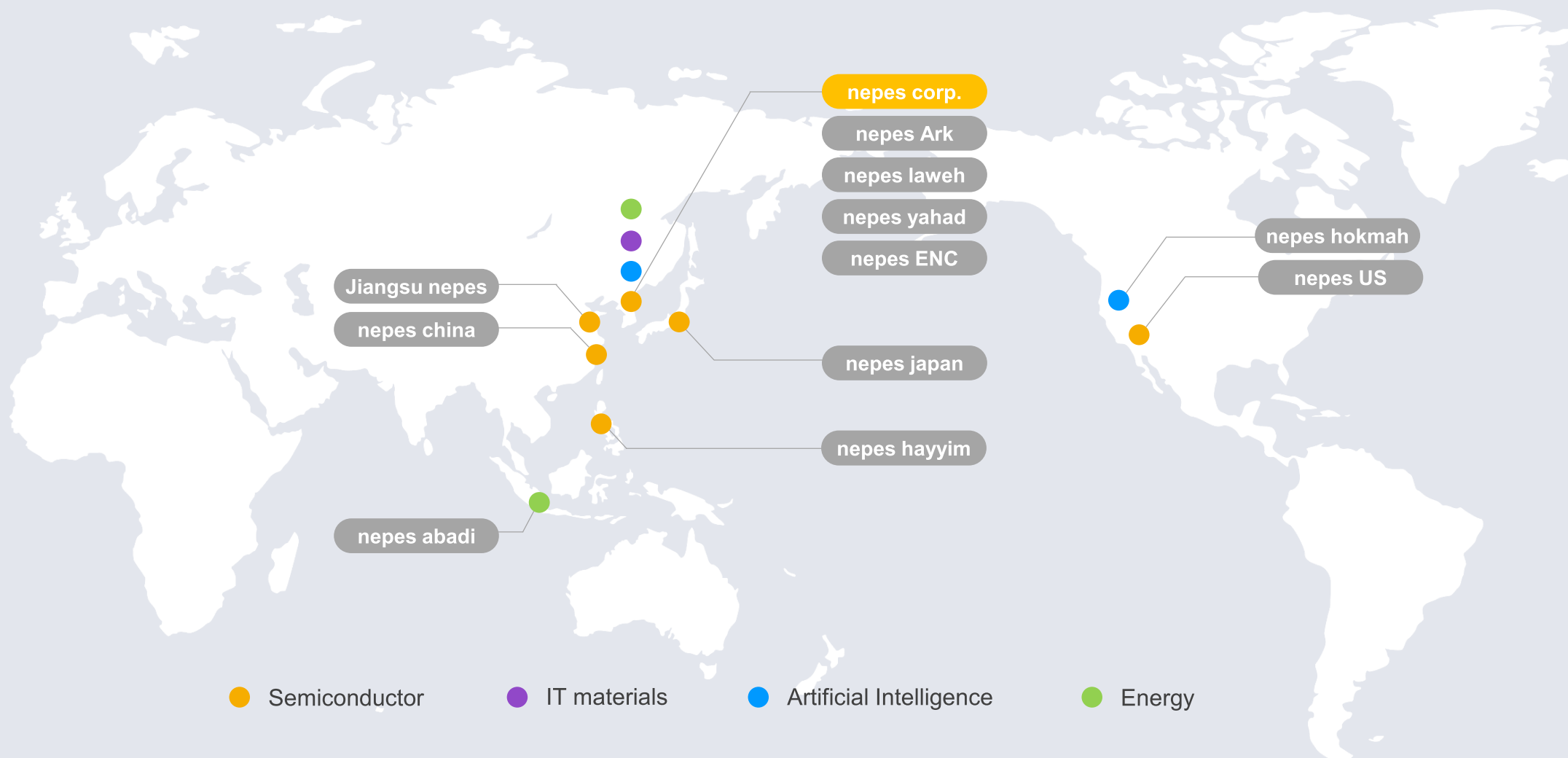
CORPORATE CULTURE

nepes continues to grow by creating performances through the development of **unique** **corporate culture** in nepes' own ways

superstar

Sharing

Global

NO.1

corporate culture

Thanks & song

i-training

3.3.7 LIFE

THANK YOU

nepes
nepes corporation

To Him who alone does great wonders, His love endures forever. Psalm 136:4
* A dandelion means 'Gratitude' in the language of flowers

President Biden ordered an executive order directing an investigation into US semiconductor supply chain, and the White House released a review report (June, '21).

- It contained the proposal of strengthening the domestic semiconductor manufacturing ecosystem by highlighting advance packaging necessary for important national security other than commercial use, and this shed light on nepes among the global top10 companies.

BUILDING RESILIENT SUPPLY CHAINS, REVITALIZING AMERICAN MANUFACTURING, AND FOSTERING BROAD-BASED GROWTH

100-Day Reviews under Executive Order 14017

June 2021

A Report by
The White House

Including Reviews by
Department of Commerce
Department of Energy
Department of Defense
Department of Health and Human Services

THE WHITE HOUSE
WASHINGTON

Advanced Packaging: Current Resilience [43p.]

The top 10 advanced packaging companies include: two IDMs (Intel (U.S.) and Samsung (South Korea)); a foundry (TSMC (Taiwan)); the top five global OSATs (ASE Group (Taiwan), SPIL (Taiwan), Amkor (U.S.) Powertech Technology (Taiwan), and JCET (China)) and two smaller OSATs, Nepes (South Korea) and Chipbond (Taiwan)). These 10 companies process approximately three-fourths of all advanced packaged chips.[92]

[Source: The White House, 'Building Resilient Supply Chains, Revitalizing American Manufacturing, and Fostering Broad-based Growth', Jun '21]

American Semiconductor Innovation Coalition (ASIC) membership is by invitation-only and IBM has asked nepes to join the Coalition in May '22

- IBM and other coalition members feel that nepes can bring a tremendous value to the coalition with its expertise in the advanced packaging such as wafer level processing and fan-out technologies

Nepes' unique management philosophy has been recognized as a creative competitiveness that drives continuous growth of the organization and has been introduced as an excellent management case at various international academic conferences.

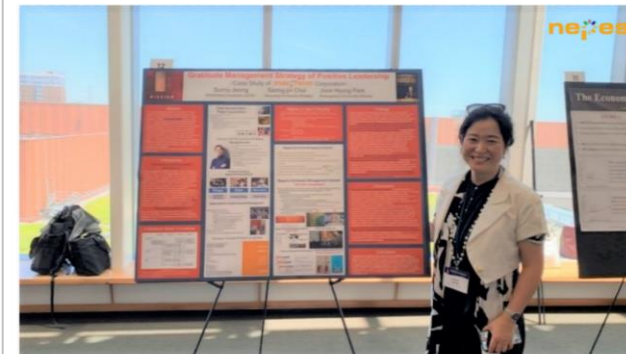May 20, 2022 @St.John's Univ. Global Conference on International HR Management

June 22-23, 2022 @ Michigan Univ. Global Conference on Positive Organization

nepes consistently practices its own management philosophy

Management Philosophy

Life of service | Attitude of challenge | Heart of gratitude

MISSION

Helping Customers Succeed

Prestigious company
—
Model company
—
Service-oriented company

Creating job

Creating customers and social values

Work

Harmony

Collaboration

Education/ Training

VISION

Global Top-Tier

Innovation
—
Creation
—
Financially Healthy

CORE VALUE

First-Class Corporate Culture

Passion · Togetherness · Gratitude

nepes is the community with people who have good personality to make things work

Useful Person

for the company
and society

Diligence
Collaboration
Exploration

Respected Person

from customers,
neighbors, and family

Patience
Honesty
Truthfulness

**Person filled
with Gratitude**

who shares a satisfied heart

Humility
Innovation
Loyalty

Type of talent
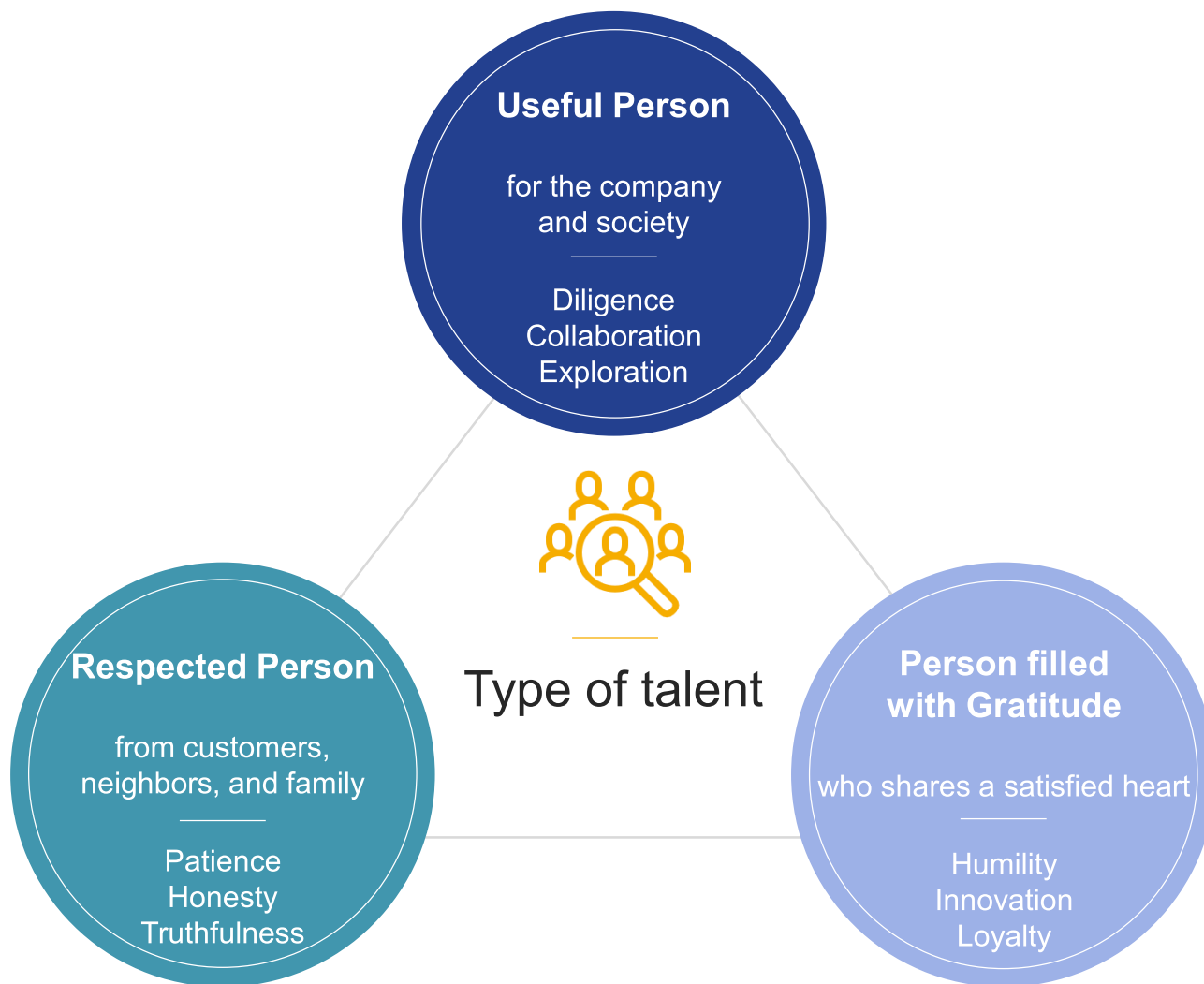
nepes LOGO

n Family community
connected via gratitude

Greetings

superstar

'superstar' is a unique word of
greeting when we say hello to
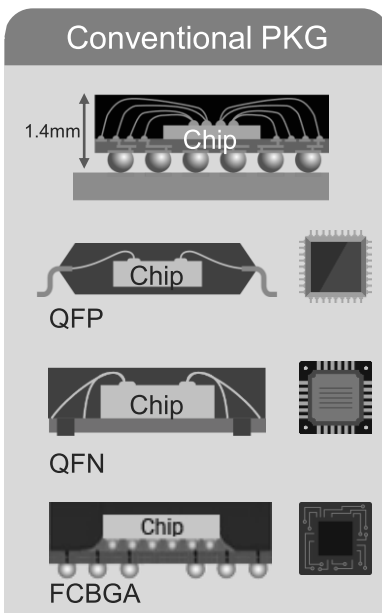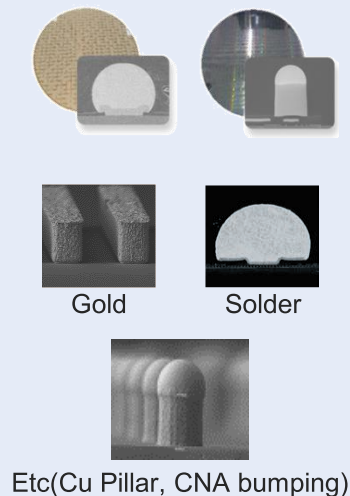others with higher respect

Market Trend

Smaller form factor
(Based on Wafer-Level Platform)

Highly integrated Wafer-Level System in Package

Tech. Roadmap
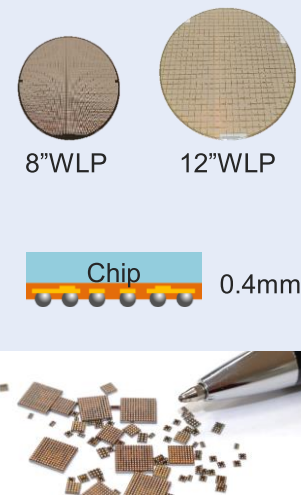
Conventional PKG	Bumping	WLP	Fan-out WLP/PLP	System in PKG
1.4mm Chip	Gold	8"WLP	nPLP™	Multi-Chip Packaging
QFP	Solder	12"WLP	600x600mm	Si GaAs
QFN		Chip 0.4mm	Chip 0.9mm	System in packaging
FCBGA	Etc(Cu Pillar, CNA bumping)			Chip

One Package Module
– AP, PMIC
– Flash Memory
– Neuromorphic

Position

nepes Back-end Foundry
(Bump, WLP, FOWLP, FOPLP, nSiP, TEST)
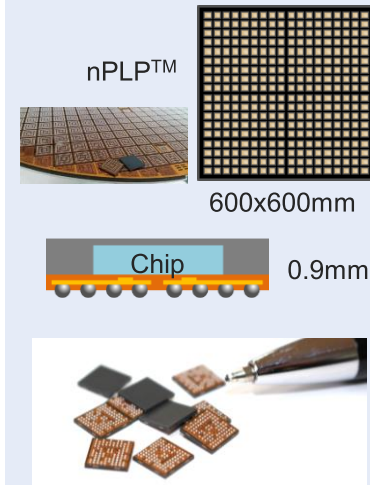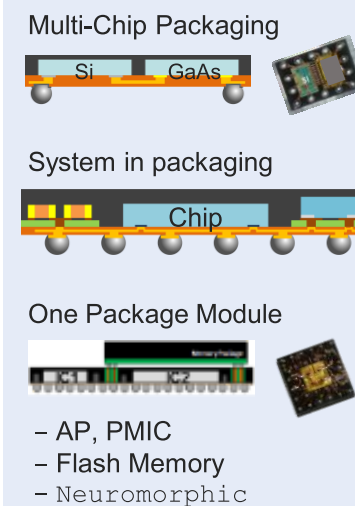
Other OSAT
Conventional wire bonding packaging & Typical WLP technology

End-fab refers to Passivation, RDL, and Bump processes after Front-Fab

Front-Fab	End-Fab	Package & Test

Front-Fab
- Oxidation
- PR -Exposure-Development
- Etching
- Ion Implantation-CVD
- Metallization

End-Fab
- Passivation 1 (Re-configuration)
- Redistribution Layer
- Passivation 2
- Under Bump Metallurgy
- Ball attach

Solder ball
UBM
PSV
RDL
PSV

Bumping, WLP

FOWLP / PLP

nSiP
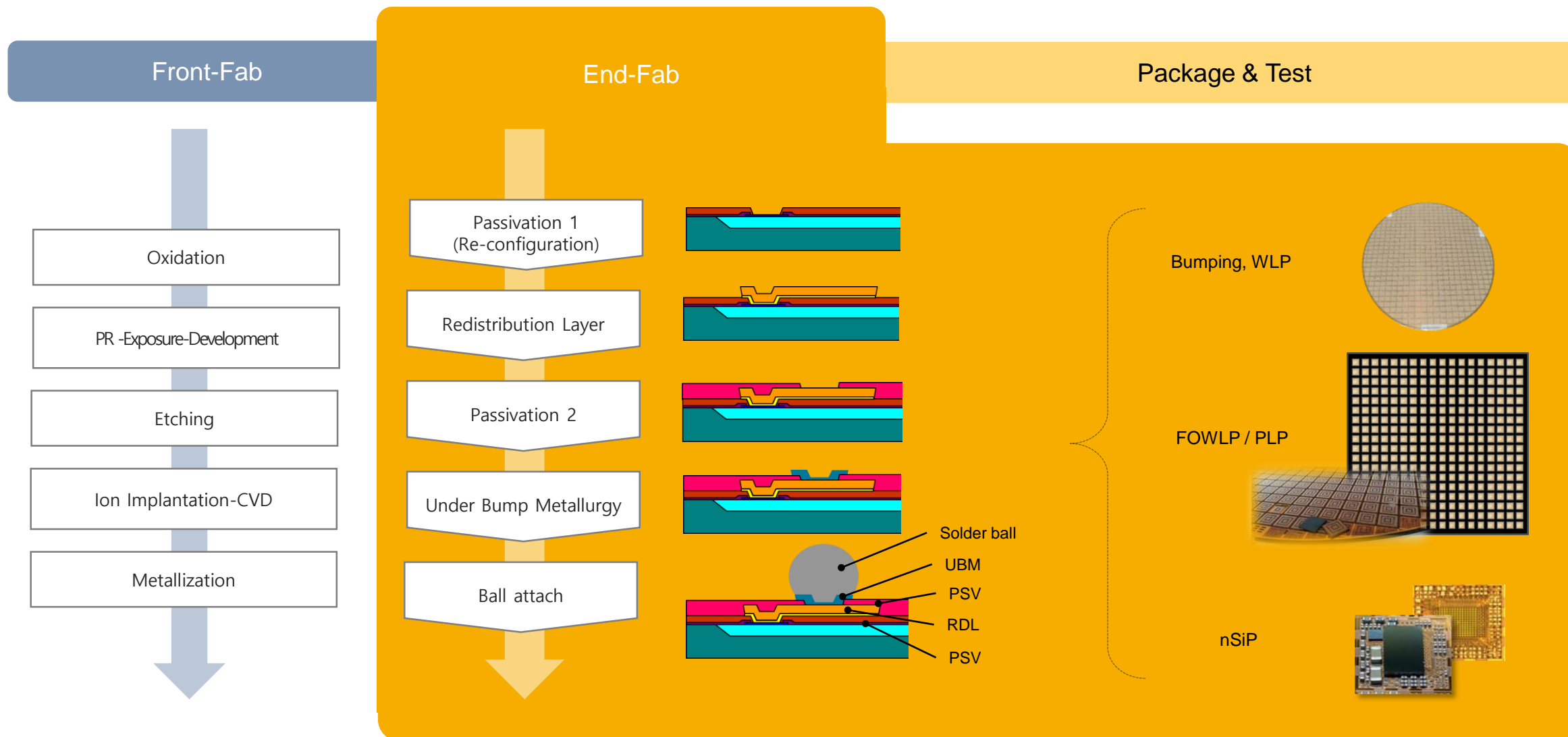
nepes

- nepes sets new standards for FOPLP with the world's largest panel size
- nepes has created a unique FOPLP technology based on FOWLP, internal materials (chemicals) development, and End-fab

600 x 600 mm
FOPLP
Generation2

415 x 515 mm
FOPLP
Generation1

300mm
FOWLP

200mm
WLP

Effective area (Ratio): 5.0 / 2.5 / 1.0 / 0.5 / 0

2008 — 2010 — 2012 — 2014 — 2016 — 2018 — 2020