

**Eat Well, Live Well.**



# **Virtual Business Briefing & Factory Tour**

**June 3, 2021**  
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**Ajinomoto Co., Inc.**

## **I. Overview of Functional Materials Business**

- Ajinomoto Group Vision and the Functional Materials Business**
- Overview of Ajinomoto Fine-Techno Co., Inc.**

## **II. Electronic Materials Business**

- ABF Development**
- Market Conditions**
- Our Growth Strategy**

# I. Overview of the Functional Materials Business

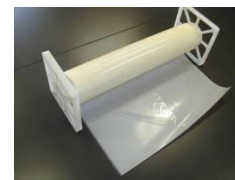
## Ajinomoto Group Vision and the Functional Materials Business

### Ajinomoto Group Vision

Contribute to greater wellness for people worldwide, unlocking the power of amino acids to resolve the food and health issues associated with dietary habits and aging



### Functional Materials Business



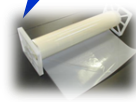
Ajinomoto Build-up Film® (ABF)



Adhesives



Activated carbon



**AJICAP™**

User needs and Ajinomoto Group-specific amino acid technologies  
B2B2C business linking both

#### Platform Technologies

- Analysis
- Quality assurance
- Enzyme modification
- Microbe breeding
- Isolation and refining
- Chemical synthesis
- Scaling up of manufacturing
- Granulation and processing

# I. Overview of the Functional Materials Business

## Ajinomoto Group Vision and the Functional Materials Business

Solve customer's issues with applied technology based on fundamental technology that works across businesses

Built a global network with bio and functional analysis

### Function Design Technology

R&D functions from Ajinomoto Fine-Techno Co., Inc. and others

Development of packaged food products and food products for customers, foods with function claims, supplements, etc.

### Deliciousness Technology

## Leading-Edge Bioscience and Fine Chemical Technologies

### Life Support

- ❑ Smart Material (Electronic Material)
- ❑ Animal Nutrition

### Healthcare

- ❑ Bio Pharma Services
- ❑ Personal Care Ingredients
- ❑ Regenerative Medicine & Cell Therapy
- ❑ Culture Medium
- ❑ *Aminoindex*<sup>®</sup> & Solution
- ❑ Amino Acids for Pharmaceuticals

### Foods

- ❑ Savory Seasonings
- ❑ Sweetener
- ❑ Food Enzymes
- ❑ Umami Ingredients
- ❑ MSG

### Fundamental Research

#### Technology Reinforcing Value

- ❑ Analytical Science and Safety Evaluations
- ❑ Manufacturing Solutions

# I. Overview of the Functional Materials Business

## Ajinomoto Group Vision and the Functional Materials Business

### The Functional Materials Business Mission & Vision

#### Mission Statement

We will contribute to a “smart life” with high-performance fine chemical products.

#### Vision

To become recognized by our customers as the best partner by building a deeper relationship with them and helping to solve their problems and issues, and by providing the best service and highly-specialized high-performance fine chemical products.



**Be the best partner  
for our customers**



**Stably supply safe  
and high-quality products**



**Realize a better society  
through our business**

# I. Overview of Ajinomoto Fine-Techno Co., Inc.

## Overview of Ajinomoto Fine-Techno Co., Inc.

**Founded: September 1942**

**Capital: ¥315 million**

**Employees: 313**

**(as of April 1, 2021)**



**Electronic Materials  
Division**

**ABF**



**Functional Materials  
Division**

**Adhesives  
Dispersing agents  
Flame retardants**

Application example

Disposable needles

Motor for HDD



**Activated Carbon  
Division**

**Activated carbon  
Adsorption resin**

Application example

Activated carbon for water purifiers,  
activated carbon filters



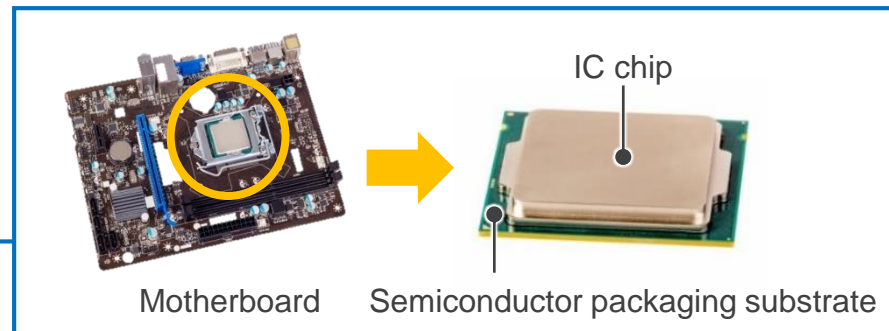
6 million kWh of natural energy, equivalent to more than 50% of power used, is derived from biomass.

# II. Electronic Materials Business: ABF Development

## What is *Ajinomoto Build-up Film*® (ABF)?

### *Ajinomoto Build-up Film*® (ABF)

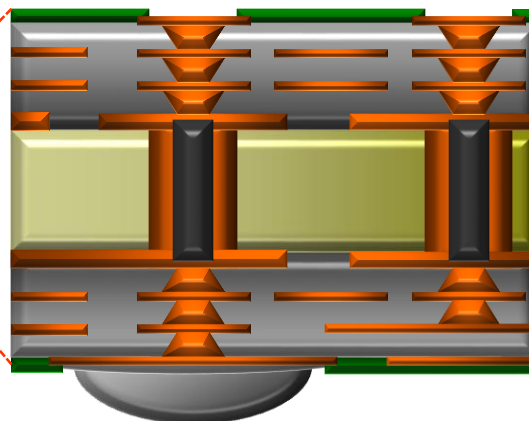
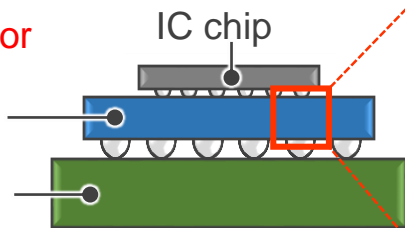
Film-type insulation material  
protecting the core components  
in personal computers



### Cross-section of packaging substrate

Semiconductor  
packaging  
substrate

Motherboard



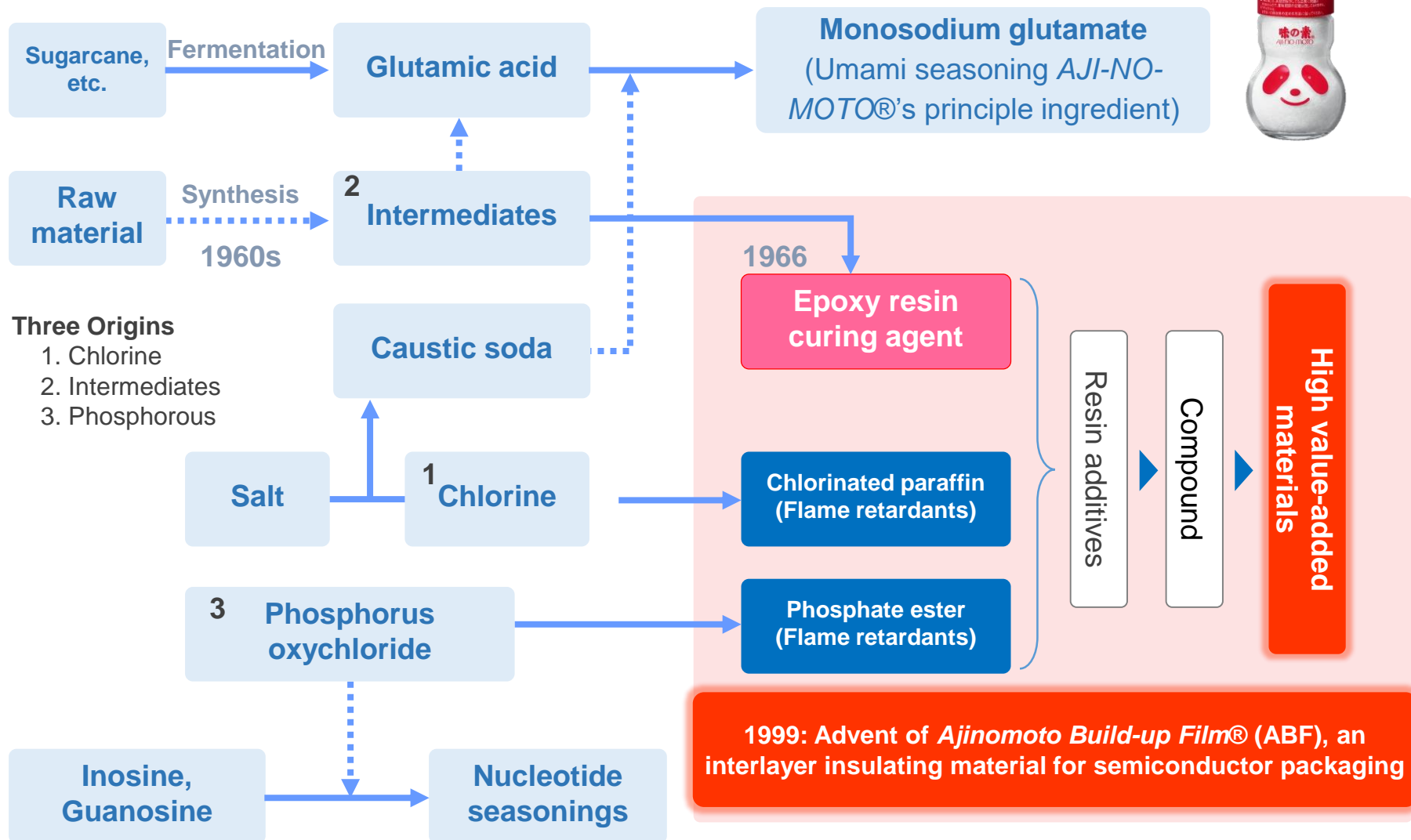
**Insulating material  
= ABF**

- IC chip protection
- Signal transmission between IC and motherboard

# II. Electronic Materials Business: ABF Development

## Origins of the Electronic Materials Business

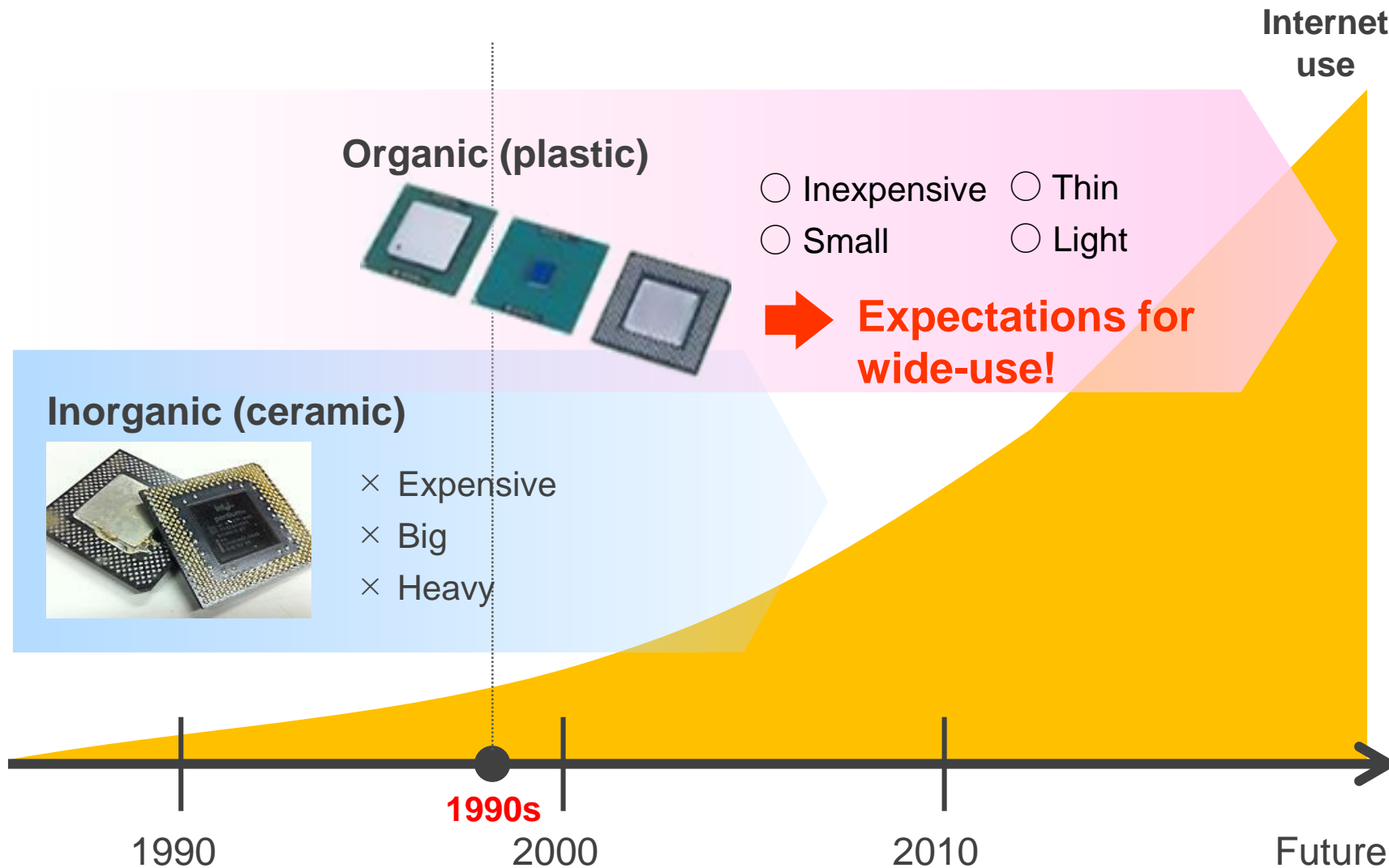
### Effective use of by-products, intermediates, and technologies





## II. Electronic Materials Business: ABF Development

### Why was ABF Adopted? (Background to Advent of ABF)



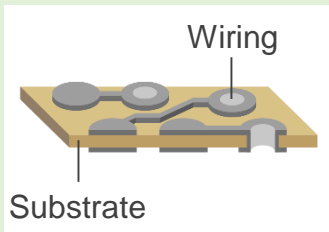
## II. Electronic Materials Business: ABF Development

1999: Advent of ABF, an Interlayer Insulating Material for Semiconductor Packaging

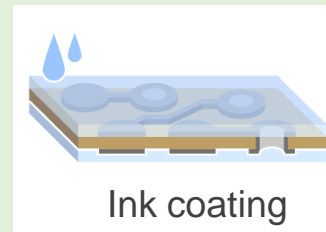
**Innovation in the manufacturing process of packaging substrates!**

Conventional  
technology

**Ink + printing process**



Drying  
&  
Flipping  
over

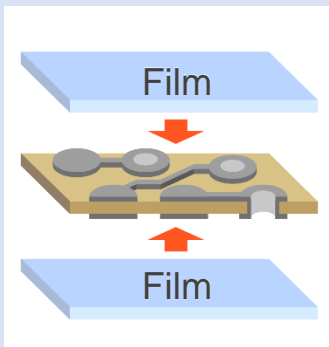


- × Many processes
- × Poor smoothness
- × Air bubbles remain between wiring

**Innovation!!**

New  
technology

**Film + laminating process**



Vacuum  
lamination  
both top and  
bottom in  
one go

**The industry's first film material**

meeting all the requirements

- ✓ High insulation reliability
- ✓ Micro wiring
- ✓ Adhesive
- ✓ Reliable connection

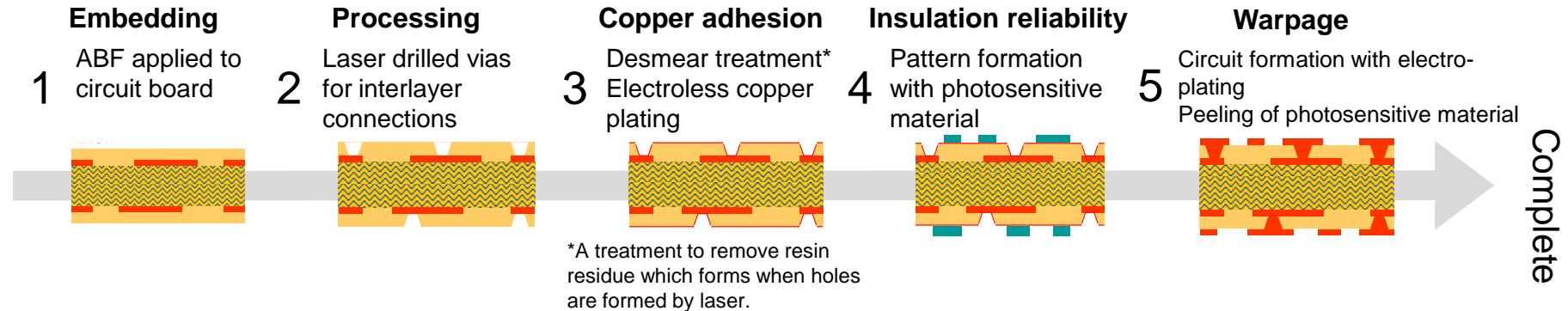
- Reduces the number of processes
- Smooth surface
- No solvent odor

# II. Electronic Materials Business: ABF Development

## Features of *Ajinomoto Build-up Film*® (ABF)

**Builds an entry barrier with solutions closely connected to customer needs**

### Customer Manufacturing Process



Vacuum laminate machine



Desmear, plating line



Reliability test equipment



Substrate warpage measuring device

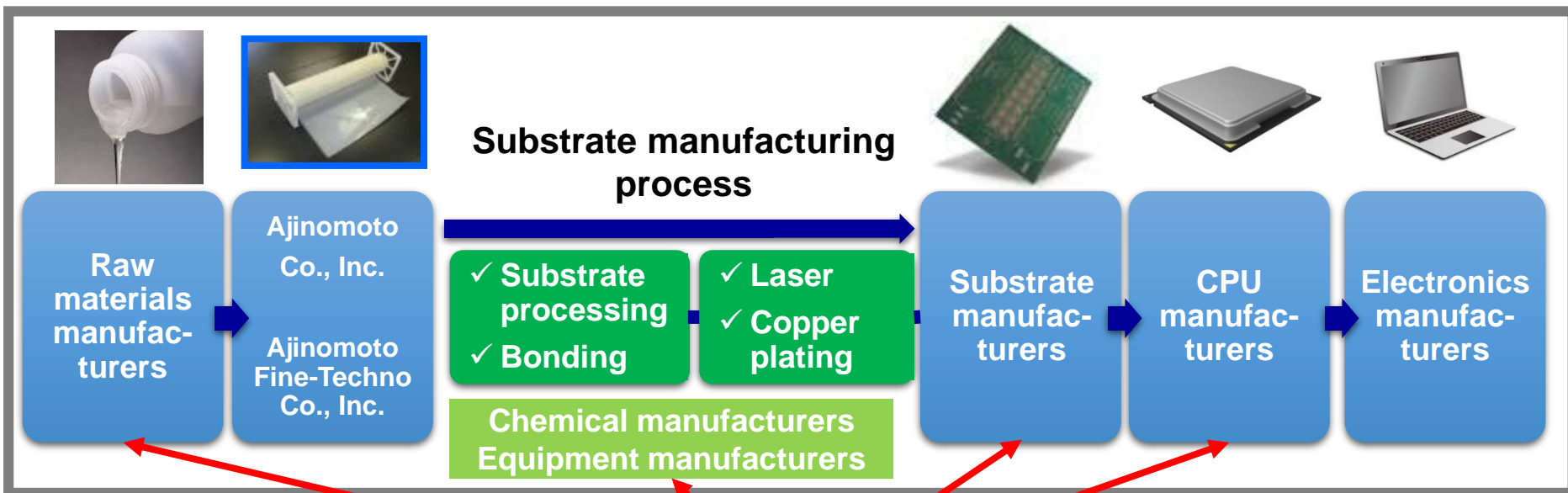


### Proposed solution

**We can make proposals that include the process by reproducing the customer manufacturing process!**

## II. Electronic Materials Business: ABF Development The *Ajinomoto Build-up Film*® (ABF) Value Chain

Close collaboration with all companies in the value chain,  
not just direct with customers

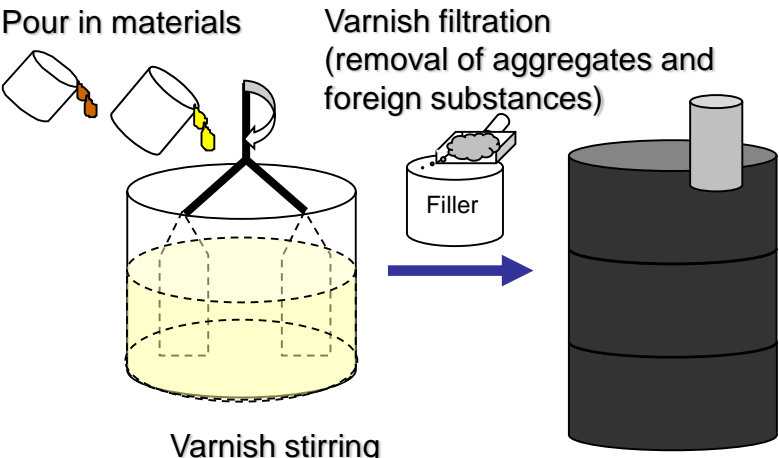


# II. Electronic Materials Business: ABF Development

## The Ajinomoto Build-up Film® (ABF) Manufacturing Process

**Asset light by outsourcing coating and logistics**

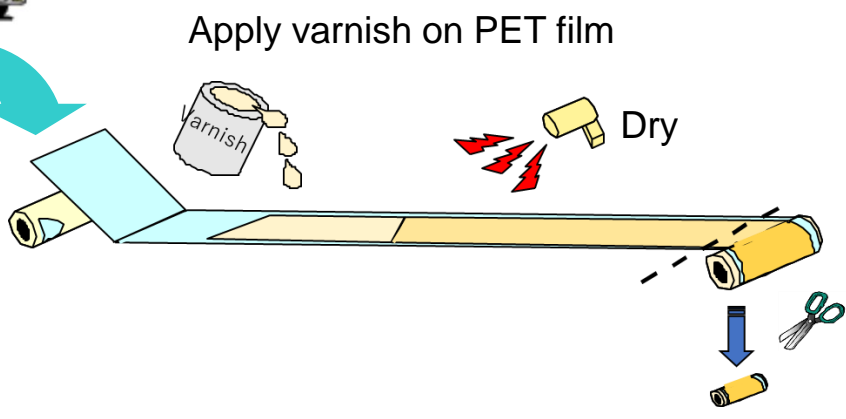
**Stage 1: Varnish production**  
Ajinomoto Fine-Techno



Refrigerated transport



**Stage 2: Coating and cutting**  
Outsourced

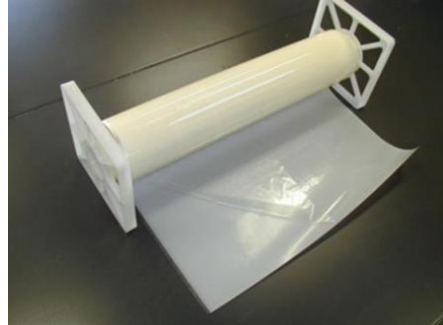


**Stage 3: Warehouse storage**  
Outsourced

Packing (frozen storage)

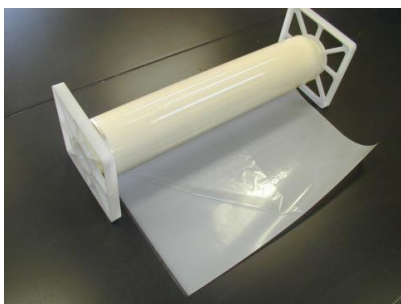
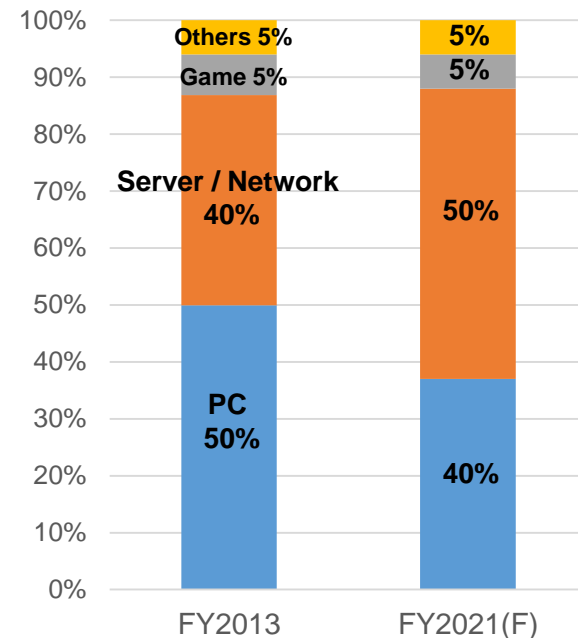


ABF complete

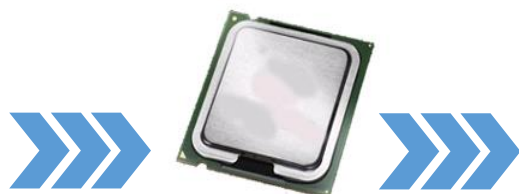


# II. Electronic Materials Business: ABF Development Applications of *Ajinomoto Build-up Film*® (ABF)

% per application (by quantity)



**ABF**



**CPU, etc.**  
Semiconductor packaging

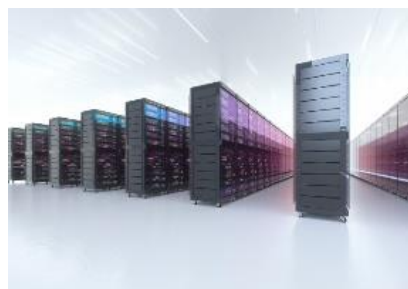


**PCs**

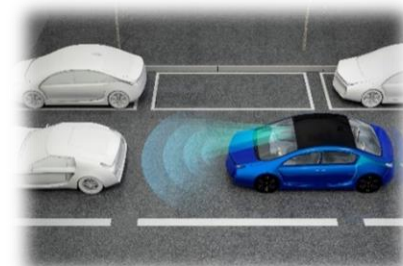
Expanding applications of ABF from PCs to other uses



**Games**



**Servers, communication networks**



**In-vehicle**

## II. Electronic Materials Business: Market Conditions

### Semiconductor Market Environment

Semiconductor-related markets have been further accelerated due to COVID-19

#### PC market

Growing demand for telework and e-learning drives more need for computers

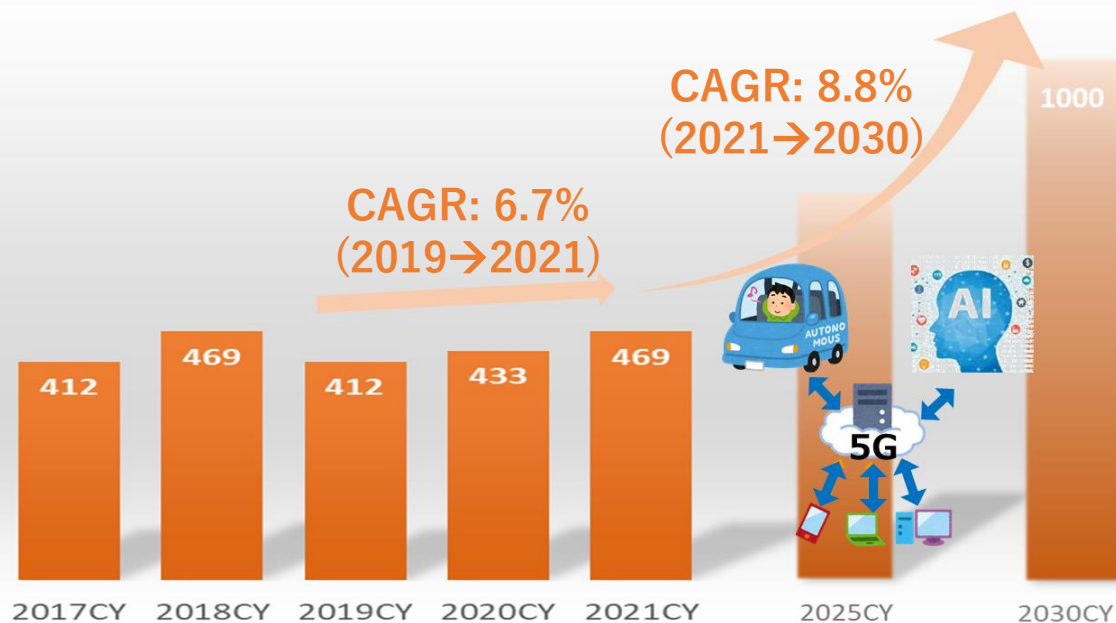


#### Server, network market

Further use of servers and communications with advent of 5G



#### Global semiconductor market (\$ billion)

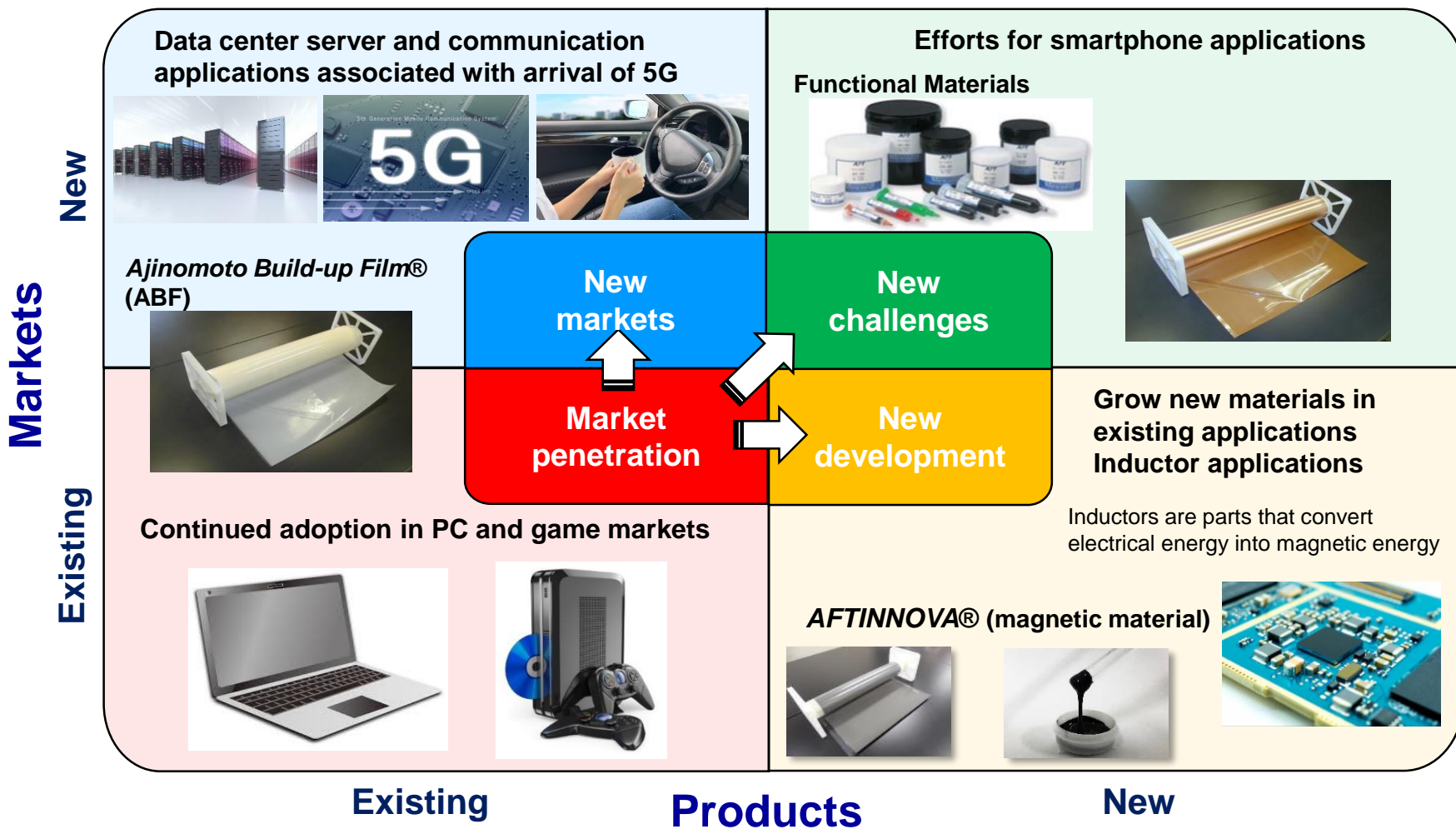


2017-2021: World Semiconductor Trade Statistics (WSTS), Fall 2020  
2030: IBS Semiconductor market Analysis, Jan 2021

Even greater rollout and use of 5G from 2022, too  
⇒ Fuels greater demand for a wide range of products such as AI and autonomous driving  
Semiconductor market expected to more than double in next 10 years

# II. Electronic Materials Business: Our Growth Strategy For ABF in FY2020–2022 Medium-Term Management Plan

Maintain and continue current business, expanding new business





# II. Electronic Materials Business: Our Growth Strategy

## ABF Market Penetration and New Market Development

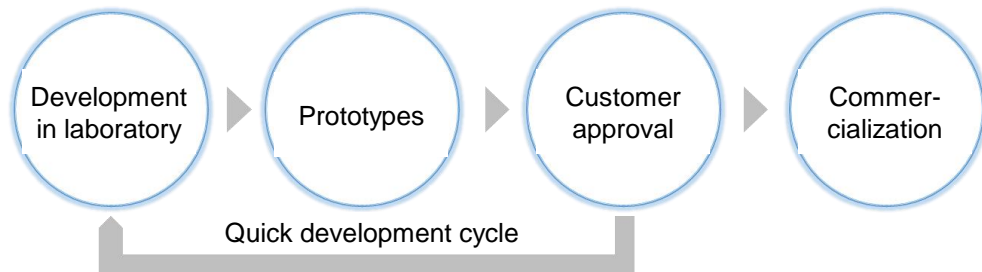
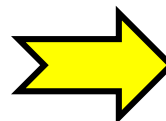
**Implement quick development cycle**  
**Build a deeper relationship with customers, helping to solve customer problems and issues**



### Future packaging trends

- ✓ Micro wiring
- ✓ Larger, more layered

**Construction of new R&D building aimed at further business expansion set for completion June 2022**



1. Latest equipment facilities to carry out evaluations
2. Larger space for experiments (60% bigger than before)
3. Collaboration with customers



### Proposed solution

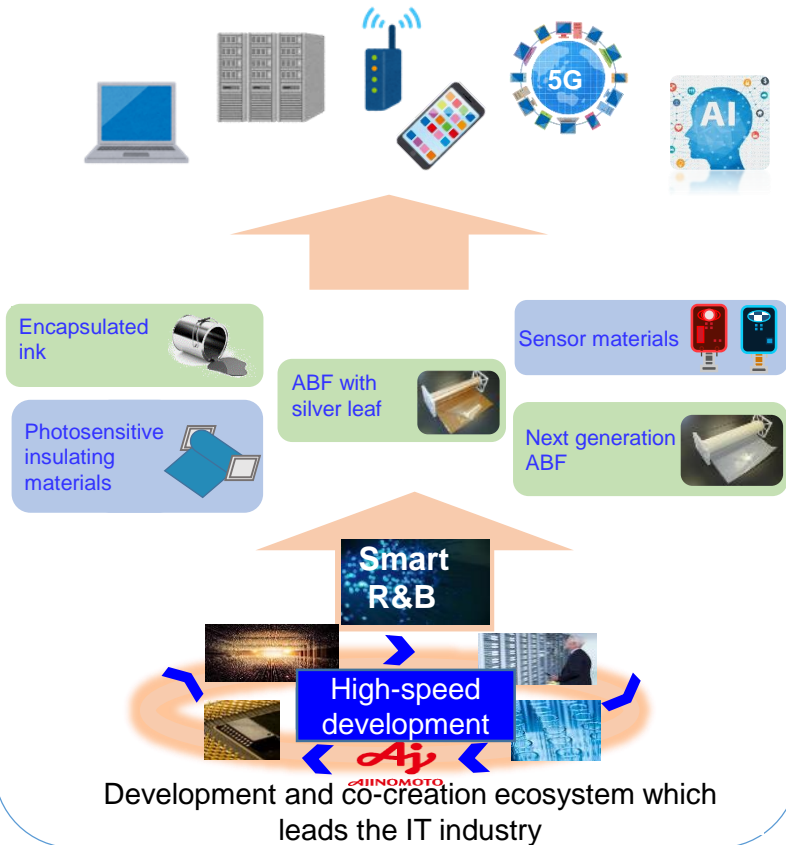
**More detailed technical support and introduction of new products to meet customer needs through a quick development cycle**

# II. Electronic Materials Business: Our Growth Strategy

## Develop Electronic Materials that Continue to Contribute to Achieving Advanced IT Modalities

By leveraging the industry's highest level technological capabilities and advanced digital technology on the base of Ajinomoto Co.'s ABF, which is a key material for semiconductor package substrates, and by continuing to provide key materials through a development co-creation ecosystem, we will contribute to the achievement of advanced IT modalities

### Ajinomoto Group's Intangible Assets x Smart R&B



### Advanced IT Modalities



Neurocomputing



Quantum computing



Optical computing

### Future Society



High-speed communication



Smart City



Autonomous driving



Decarbonized society

## II. Electronic Materials Business: Our Growth Strategy A Business Network Supporting Greater Research

Ajinomoto Co., Inc.  
Ajinomoto Fine-Techno Co., Inc.



- ✓ R&D
- ✓ Technical support
- ✓ Technical discussions with customers
- ✓ Sales and purchasing
- ✓ Manufacturing
- ✓ Quality assurance

Ajinomoto Fine-Techno USA Corporation



Cupertino California

All the cutting edge  
information from silicon  
valley

Taiso Commerce Inc.  
Ajinomoto Shanghai Specialty Chemicals Co., Ltd.



Taipei City

Information from Taiwan  
and China, powerhouses  
in semiconductor  
manufacturing

# ASV (The Ajinomoto Group Creating Shared Value)

**5G networks**



**Cloud / Data centers**



**AI**



**In-vehicle**



**Education**



**Helping people to “Live well” through improved connectivity, improved communication, improved convenience, improved quality of life.**

**Smart cities**



**Medical care**



**Space**



**Industry**



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- **Forward-looking statements, such as business performance forecasts, made in these materials are based on management's estimates, assumptions and projections at the time of publication. A number of factors could cause actual results to differ materially from expectations.**
- **This material includes summary figures that have not been audited so the numbers may change.**