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Biographies & contacts

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Previously, Amandine worked as Process engineer on CVD and ALD processes for semiconductor applications at Air Liquide. Amandine was based in Japan during one year to manage these projects.

Amandine graduated from CPE Lyon (France), with a technical expertise in Semiconductor & Nano-Electronics and holds an electronics engineering degree followed by a master’s in semiconductor manufacturing technology from KTH Royal institute of technology (Sweden).

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Lauranne Chemisky is a technology and market analyst in the Semiconductor & Software Team at Yole Développement (Yole). Lauranne is currently engaged in the development of market research reports as well as customized services for clients. She is able to leverage her technology training and experience in the fields of materials and semiconductor manufacturing processes for advanced packaging applications. Previously, Lauranne worked at Apple in the Softgoods Product Design Team as a material development engineer (CA, USA).

Lauranne holds a master’s degree in Materials Science & Polymers from ITECH (Lyon, FR) and an M.Sc. in Technology and Innovation Management from EM Business School (Lyon, FR).
COMPANIES CITED IN THE REPORT

(non-exhaustive list)

REPORT OBJECTIVES

• This report is a research update for the Polymeric materials market in the field of Advanced Packaging applications to provide an understanding of the applications, he technology trends, and market forecasts by function and End applications.

• The objectives of the report are to
  • Provide detailed information regarding the applicability of the polymeric material for Advanced Packaging applications
  • Detailed analysis of the major Advanced Packaging platforms using polymeric materials that could require the use of polymeric materials
  • Polymeric materials roadmap for the Advanced packaging platforms
  • Give the current status of the polymeric material adoption and the various type of polymeric material available on the market
  • Provide an overview of the technological trends for polymeric material
  • Understand the key benefits and added value of the polymeric material in the field of Advanced Packaging
    • How does polymeric material differ from the other alternative material solutions
  • Understand what are the remaining challenges of the implementation of the polymeric material in the field of Advanced Packaging
  • Offer market metrics at polymeric material market level for Advanced Packaging applications (2017-2023)
  • Evaluate market developments in terms of market size (volume, value, quantity), by material function and by Advanced Packaging platform
  • Provide a competitive landscape, identify key players in technology development and manufacturing
  • Give an overview of who is doing what, and specificities of each market

• The report does not cover the following applications
  • MEMS packaging
  • Panel substrate
  • Die-to-die assembly process
REPORT METHODOLOGY

Technology analysis methodology

1. Define the key parameters
2. Understand the requested specifications per parameter and application
3. Define the competing technologies and the potential evolutions of the technologies
4. Define the roadblocks and challenges to be overcome
5. Establish the technology roadmaps and maps
6. Experts discussions

Information collection

- Analysts’ processing to answer your needs and questionnins on market size, positioning, technical challenges...
- Trade shows attendance and participation
- Literature, web, academic publications, white papers...
- System designers
- OSAT
- Device makers
- Equipment makers
- Material makers
Yole’s market forecast methodology is based on a top-down + bottom-up approach, including dozens of interviews with companies throughout the value chain.
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  - Suppliers marker share
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Polymeric Materials

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  • Benefit of polymeric permanent bonding
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  • Key requirements and challenges
  • Application and process flow
  • Market Forecast (in $M & volume)
    • Per material type
    • Per Packaging platform
  • Suppliers marker share

• **Molding compound**
  • Molding compound description
  • Comparison of all the available types of material
  • Benefit of polymeric mold compound
  • Current used polymeric materials

• **Underfill**
  • Underfill description
  • Comparison of all the available types of material
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    - Per material type
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- **Temporary bonding**
  - Temporary bonding description
  - Comparison of all the available types of material
  - Benefit of polymeric temporary bonding
  - Current used polymeric materials

### Appendix

- Appendix

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*Yole Development*  
Polymeric materials for Advanced Packaging at the wafer-level | Sample | www.yole.fr | ©2018
KEY PACKAGING FAMILIES

Focus on this report

No substrate

Organic substrates

Leadframe substrates

Ceramic substrates

Embeded Die

Wirebond

Flip-Chip

Fan-Out WLCSP

Wirebond

CSP LGA

BGA CSP LGA

BGA CSP LGA

QFN/QFP Hi Rel

Flip Chip

Wirebond

Flip-Chip

BGA CSP LGA

FC BGA SOIC

FO on Substrate TSOP

2.5D/2.1D LCC

3D DIP

Polymeric materials for Advanced Packaging at the wafer-level | Sample | www.yole.fr | ©2018
### KEY PACKAGING FAMILIES
Platforms focus on the report

<table>
<thead>
<tr>
<th>Packaging platforms</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>No substrate</strong></td>
<td><strong>Wafer-Level Chip Scale Package (WLCSP)</strong></td>
</tr>
<tr>
<td>The bumped integrated circuits can be directly mounted onto the printed circuit board of the end equipment by the original equipment maker</td>
<td></td>
</tr>
<tr>
<td><strong>Fan-Out Wafer-Level Packaging</strong></td>
<td>Fan-Out is that it is a package from which connections and bumping are out of the chip scale and where interconnections are RDL-based</td>
</tr>
<tr>
<td><strong>Organic substrates</strong></td>
<td><strong>FC BGA/CSP</strong></td>
</tr>
<tr>
<td>Flip chip packages utilize an intermediate “high density interconnect” (HDI) printed circuit board</td>
<td><strong>2.5D interposer</strong></td>
</tr>
<tr>
<td>Any kind of substrate has the function of “interposing” between the die and PCB, however for practical purposes, the term interposer is used for additional interconnect components on top of a substrate, namely Si and Glass interposers</td>
<td></td>
</tr>
</tbody>
</table>

**2.5D interposer**

**3D TSV is a way to stack dies based on TSV interconnections used to stack silicon interconnect technology**
Global Wafer forecast demand for Advanced Packaging

(in 300mm wafer eq. wafer starts)

Yole Developpement © November 2018

Volume (in 12 inch eq wafer starts)

0


- FC-3D TSV memories
- FC-2.5D TSV
- FC-CSP
- FC-BGA
- Fan-In WLP
- Fan-Out WLP
Megatrend applications like 5G wireless technologies, electric vehicles, and advanced mobile devices demand miniaturization and extra functionality.

**Megatrend applications**
- 5G
- Advanced mobile
- Voice processing
- Smart automotive/ADAS
- Artificial intelligence
- AR/VR
- Data center

**Advanced Packaging’s new requirements**
- Higher functionalities
- Lower power consumption
- Higher bandwidth
- More memory & sensors
- Lower latency
- Higher speed
- Higher features size for further miniaturization

**Material processing: new needs**
- Stacked wafers: increased density
- Larger wafer size
- New material deposition methods to implement
- Advanced lithography patterning
- New materials to be deposited depending on the feature size

**INVESTMENT IN NEW MATERIALS IMPACTED BY MEGATRENDS APPLICATIONS**

*Advanced Packaging*
BENEFITS OF POLYMERIC MATERIALS FOR PACKAGING

Added-value of polymeric materials

Polymeric materials could offer better performance than any other type of materials.

Why polymeric material in the Advanced Packaging area?

**Electrical**
- Insulating
- Breakdown Voltage
- Loss
- Energy dissipation

**Mechanical**
- Modulus
- Elongation
- Tensile Strength
- Viscosity

**Physical**
- Optical
- Thermal stability
- Thermal conductivity
- Tg
- CTE

**Chemical**
- Water absorption
- Adhesion
- Surface finish
- Chemical resistance
Polymeric materials could be used in two different ways to fabricate a product:

**Polymeric-based product**
- Polymeric material is applied as a permanent material and remains in the final product.

**Polymeric-based process**
- Polymeric material is applied for temporary use in the process flow and then removed after the IC device is processed.
- This polymeric material applied temporarily is used for the fabrication of device but does not remain in the final product.
Polymeric Materials for Advanced Packaging at the Wafer-Level

Polymeric Materials

Direct material

- Dielectric material
- Bonding stacked material
- Molding compound
- Underfill
- Temporary bonding
- Photo-resist

Indirect material

- Temporary bonding
- Photo-resist
<table>
<thead>
<tr>
<th>Advanced Packaging segments</th>
<th>Polymeric materials</th>
<th>Polymeric Material functionalities</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Direct material</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Dielectric material</td>
</tr>
<tr>
<td>Advanced Packaging platforms</td>
<td>FO WLP</td>
<td>✓</td>
</tr>
<tr>
<td></td>
<td>WLCSP</td>
<td>✓</td>
</tr>
<tr>
<td></td>
<td>Flip-Chip</td>
<td>✓</td>
</tr>
<tr>
<td></td>
<td>2.5D interposer</td>
<td>✓</td>
</tr>
<tr>
<td></td>
<td>FC-BGA</td>
<td>✓</td>
</tr>
<tr>
<td></td>
<td>FC BGA</td>
<td>✓</td>
</tr>
<tr>
<td></td>
<td>TSV way to connect</td>
<td>✓</td>
</tr>
<tr>
<td></td>
<td>3D stacked memories</td>
<td>✓</td>
</tr>
<tr>
<td></td>
<td>3D BSI</td>
<td>✓</td>
</tr>
</tbody>
</table>

**On production**

**On development/evaluation**
**WHERE POLYMERIC MATERIALS ARE APPLIED?**

In the field of Advanced Packaging

<table>
<thead>
<tr>
<th>MATERIAL FUNCTION</th>
<th>PROCESS STEP LEVEL</th>
<th>ROLE</th>
<th>ADVANCED PACKAGING PLATFORM</th>
</tr>
</thead>
<tbody>
<tr>
<td>Photoresist</td>
<td>RDL</td>
<td>Patterning</td>
<td>FO WLP</td>
</tr>
<tr>
<td></td>
<td>Bump/UBM</td>
<td></td>
<td>FC BGA</td>
</tr>
<tr>
<td></td>
<td>TSV</td>
<td></td>
<td>2.5D interposer</td>
</tr>
<tr>
<td>Permanent Bonding</td>
<td>D2W assembly</td>
<td>Mechanical support</td>
<td>3D TSV (development)</td>
</tr>
<tr>
<td>stacked material</td>
<td>W2W assembly</td>
<td>Miniaturization</td>
<td></td>
</tr>
<tr>
<td>Temporary bonding &amp;</td>
<td>Bonding/debonding carrier from the</td>
<td>Handling wafer</td>
<td></td>
</tr>
<tr>
<td>debonding</td>
<td>semiconductor device</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Underfill</td>
<td>Bump/UBM</td>
<td>Mechanical support</td>
<td></td>
</tr>
<tr>
<td></td>
<td>D2W</td>
<td>Repassivation</td>
<td></td>
</tr>
<tr>
<td>Dielectric material</td>
<td>RDL</td>
<td>Passivation</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Bump/UBM</td>
<td>Isolation</td>
<td></td>
</tr>
<tr>
<td></td>
<td>TSV</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Molding compound</td>
<td>Encapsulation</td>
<td>Reconstituted wafer</td>
<td></td>
</tr>
</tbody>
</table>

**ADVANCED PACKAGING PLATFORM**

- FO WLP
- FC BGA
- 3D TSV (development)
- 3D TSV
- 2.5D interposer
- 2.5D interposer
- 3D TSV
- High density FO WLP
- 3D TSV
- 2.5D interposer
- 2.5D interposer
- 3D TSV
**Breakdown by polymeric material function**

- **CAGR 12%**

- **Revenue (in $M)**
  - $0 M
  - $200 M
  - $400 M
  - $600 M
  - $800 M
  - $1,000 M
  - $1,200 M
  - $1,400 M

- **Years**
  - 2018
  - 2019
  - 2020
  - 2021
  - 2022
  - 2023

- **Polymeric Materials Demand for Advanced Packaging**

- **AR/VR**
- **AI**
- **Data center**
- **5G**
- **Advanced mobile**
- **Smart automotive**

- **Revenue Breakdown by Polymeric Material Function**
  - **Dielectric**
  - **Underfill**
  - **Molding compound**
  - **Photoresist**
  - **Temporary bonding**

- **Technologies**
  - 3D TSV
  - FO WLP
  - WLCSP
  - 2.5D interposer
  - FO WLP
  - FC BGA
  - FO WLP
  - WLCSP
  - FC BGA
  - FO WLP
Total Polymeric material for Advanced Packaging at the wafer-level

- **Dielectric material**
- **Photoresist material**
- **Molding compound material**
- **Temporary bonding material**
- **Underfill**

2017

- <$700M
  - ~$370M
  - <$200M
  - >$70M
  - <$20M

2023

- ~$1.3B
  - ~$610M (CAGR: +12%)
  - ~$340M (CAGR: 10%)
  - ~$180M (CAGR: +13%)

POLYMERIC MATERIALs DEMAND FOR ADVANCED PACKAGING* FROM 2017 TO 2023

*New Brand Equipment

**CAGR: Compound Annual Growth Rate

21
POLYMERIC MATERIALS CATEGORIES - OVERVIEW

Advanced Packaging

Polymeric material for semiconductor

Epoxies (EPO)  Polyimides (PI or PSPI)  Polybenzoxazole (PBO)  Benzocyclobutene (BCB)  WPR  Silicones  Al-X  Others

Fluoropolymers (PFCB)  Polyparaxylene (PPX)  Polynorbornene (PNB)
### Main properties of polymers

<table>
<thead>
<tr>
<th>Property</th>
<th>PI</th>
<th>BCB</th>
<th>PBO</th>
<th>Epoxy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dielectric constant</td>
<td>2.0</td>
<td>2.5</td>
<td>3.0</td>
<td>3.5</td>
</tr>
<tr>
<td>CTE (ppm/°C)</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Modulus (GPa)</td>
<td></td>
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</tr>
<tr>
<td>Tensile Strength (MPa)</td>
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<tr>
<td>Elongation (%)</td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Tg (°C)</td>
<td></td>
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<tr>
<td>Cure temperature (°C)</td>
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<tr>
<td>Stress (MPa)</td>
<td></td>
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<td></td>
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<tr>
<td>Water absorption (%)</td>
<td></td>
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</tbody>
</table>

Each material have advantages and drawbacks.
### Polymeric Materials for Advanced Packaging at the Wafer-level

#### Advanced Packaging segments

<table>
<thead>
<tr>
<th>Polymeric materials</th>
<th>Polymeric Material functionalities</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td><strong>Direct material</strong></td>
</tr>
<tr>
<td></td>
<td>Dielectric material</td>
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<tr>
<td></td>
<td>Molding Compound</td>
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<tr>
<td></td>
<td>Temporary bonding</td>
</tr>
<tr>
<td>FO WLP</td>
<td>PI PBO WPR</td>
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<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>WLCSP</td>
<td>PI PBO</td>
</tr>
<tr>
<td><strong>Advanced Packaging platforms</strong></td>
<td><strong>Flip-Chip</strong></td>
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<td></td>
<td><strong>FC-BGA/CSP</strong></td>
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<td><strong>FC BGA</strong></td>
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<td></td>
<td><strong>TSV way to connect</strong></td>
</tr>
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<td></td>
<td><strong>3D stacked memories</strong></td>
</tr>
<tr>
<td></td>
<td><strong>3D BSI</strong></td>
</tr>
</tbody>
</table>

**Polymeric material functionalities**: Dielectric material, Bonding Stacked material, Molding Compound, Underfill, Temporary bonding, Photo-resist.
KEY POLYMERIC MATERIALS SUPPLIERS FOR PACKAGING

By functionality (non-exhaustive list) – An exhaustive list of companies will be provided in the full report.

Direct materials

Dielectric material
- Merck
- Dow
- HD MicroSystems
- JSR
- Toray
- Asahi Kasei
- Fujifilm

Permanent bonding
- Dow
- Nippon Kayaku
- JSR
- Toray

Molding Compound
- Henkel
- NAGASE
- Sumitomo Bakelite Co., Ltd.
- Hitachi Chemical
- Shin Etsu
- Namics

Underfill
- Henkel
- Dow
- NAGASE
- Sumitomo Bakelite Co., Ltd.
- Hitachi Chemical
- Shin Etsu

Indirect materials

Temporary bonding materials
- HD MicroSystems
- 3M
- Thin Materials
- JSR
- JSR Corporation

Photo-resist
- Dow
- JSR Corporation
- Cookson Electronics
- Tempur
- Tok
- Shin Etsu
- Nippon Kayaku
In the field of Advanced Packaging

Dielectric material: Fujifilm, Asahi, Kasei, Sumitomo BAKELITE CO., LTD.

Mold compound: NAGASE 90%

Underfill: HitachiChemical, Dow, ‘TORAY’, SUMITOMO BAKELITE CO., LTD.

Photoresist: NISAN CHEMICAL INDUSTRIES, LTD., Cookson Electronics, Empur, ‘tok’

Temporary Bonding: 3M, ShinEtsu, ‘tok’

*Non-exhaustive list of companies - Full analysis in the report - Each color is associated to a material supplier’s market share
**POLYMERIC MATERIALS FOR ADVANCED PACKAGING AT THE WAFER-LEVEL**

*Market & Technology report - November 2018*

Polymeric materials market revenue will double over the next five years.

**KEY FEATURES**
- Detailed analysis of polymeric materials used in the following advanced packaging platforms: WLCSP (fan-in WLP), FOWLP, flip-chip (FC BGA/CSP), 2.5D interposer, 3D stacked TSV.
- Thorough analysis of the polymeric materials used in different material-based functionalities, including dielectric material, bonding stacked material, molding compound, underfill, photoresists, and temporary bonding material.
- 2017 - 2023 polymeric materials market metrics (value and quantity): breakdown by advanced packaging platform and material functionality.
- 2017 global polymeric materials market share in the advanced packaging sector.
- 2017 polymeric materials suppliers, by material function.
- Overview of the players using polymeric materials, by advanced packaging application and by function.
- Roadmap for polymeric materials adoption.
- Updated polymeric materials technology trends analysis across advanced packaging platforms.

**POLYMERIC MATERIALS: MASSIVE MARKET ADOPTION IN THE ADVANCED PACKAGING SECTOR**

Driven by movements towards further miniaturization and higher functionalities, megatrend applications like artificial intelligence (AI), 5G, and augmented reality (AR)/virtual reality (VR) are creating huge business opportunities and contributing to the growth of advanced packaging applications. Indeed, these megatrend applications are fueling the next generation of advanced packaging platforms (high-density FOWLP, 3D stacked TSV memory, WLCSP, and flip-chip), which have reached a new level of complexity and now demand higher integration-level requirements. These lofty standards will strongly influence the increasing demand for advanced materials with new technical specifications, in order to achieve better performance.

With respect to materials, polymeric materials (due to their excellent electrical, chemical, and mechanical properties) are already being applied in large-volume manufacturing in some advanced packaging process steps, and will increasingly be implemented when adopting additional functionalities in the same field.

The polymeric materials market generated revenue in excess of $700M in 2018, driven by dielectric material, and is expected to peak at ~$1.3B by 2023 with a 12% compound annual growth rate (CAGR) depending on the material type over this period. Polymeric materials growth will find support mostly from the expansion of dielectric material for more complex devices, followed by the broad introduction of polymeric temporary bonding material. The latter will be accelerated by the ramp-up of 3D stacked TSV in DRAM memory applications.

In this context, Yole Développement’s report explains the dynamics of the polymeric materials market, as well as the advanced packaging platforms currently integrating polymeric materials. This report also offers: a detailed analysis of the polymeric materials market (by volume and value for advanced packaging); a market growth estimate for the 2017 - 2023 timeframe; and breakdowns by advanced packaging platforms and material function type.

**DISPERSSION OF POLYMERIC MATERIALS INTO DIFFERENT FUNCTIONALITIES THROUGHOUT THE PACKAGING SECTOR**

Polymeric materials are primarily used to protect printed wiring boards (PWB) from moisture, handling, and environmental influences. However, over the last few years, polymeric materials have attracted significant interest in the microelectronics field, while also making serious inroads in the advanced packaging area, adopting numerous functionalities within various packaging platforms.

There are a wide variety of polymeric materials available to packaging manufacturers: PI, PBO, BCB, epoxies, silicones, and acrylic, all of which are defined by their constant dielectric, cure temperature, stress, etc. Today, polymeric materials in the advanced packaging industry have already found integration in major process steps: RDL, bump/UBM, through-silicon vias (TSV), and assembly levels, as well as at the bonding interface.
For polymeric dielectric materials-driven RDL passivation and UBM re-passivation, polyimide (PI)-based material is often favored. However, it appears that PBO, with its high drop-reliability properties, is an appealing choice for thick RDL layers in a thickness range above >10um. Moreover, it has been demonstrated that warpage and stress are greatly reduced with PBO, especially for bigger wafer sizes (300 mm).

Looking ahead, the molding compound only used for FOWLP at the wafer packaging level is based primarily on an epoxy which requires a low-as-possible CTE in order to avoid the wafer warpage issues induced via CTE mismatch between mold and silicon. Also, the high adhesion between the polymeric molding material and RDL must undergo a reliability test.

From a technical point of view, liquid molding compound is today the dominant material applied at wafer level for FOWLP. Nevertheless, granular material could move ahead in the polymeric materials market for FOWLP at both wafer and panel level.

### Dispersal of polymeric materials into different functionalities throughout the advanced packaging sector

<table>
<thead>
<tr>
<th>MATERIAL FUNCTION</th>
<th>PROCESS STEP LEVEL</th>
<th>ROLE</th>
<th>ADVANCED PACKAGING PLATFORM</th>
</tr>
</thead>
<tbody>
<tr>
<td>Photore sist</td>
<td>RDL</td>
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<td>FC BGA</td>
</tr>
<tr>
<td></td>
<td>D2W assembly</td>
<td>Mechanical</td>
<td>3D TSV (development)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>support</td>
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(Yole Développement, November 2018)

### MATERIALS SUPPLIERS PRIZE SPECIALIZATION AS A MEANS OF DIFFERENTIATING THEMSELVES AND SUCCESSFULLY COMPETING IN THE ADVANCED PACKAGING FIELD

The polymeric materials market is diversified and fragmented into varied suppliers like HD Microsystems, JSR Corporation, Merck, DOW, Nagase, Asahi Kasei, Henkel, Hitachi Chemical, Sumitomo Bakelite, TOK, Brewer Science etc. including several polymeric materials suppliers focused on one specific material. Each company has developed expertise in a specific material or two, but not all of them. Thus there is no clear leader amongst materials suppliers across the different functions and sectors – rather, one supplier is dominant in each material category.

Looking ahead, most materials suppliers involved with advanced packaging originate in myriad fields, from agricultural to pharmaceuticals, and span the entire materials range for microelectronics. Lucrative microelectronics business opportunities drive M&As between materials suppliers entering from different industries in a quest to acquire share in advanced packaging.

Some materials vendors utilize different strategies to skip a step in the advanced packaging polymeric materials process:

- In an effort to evolve towards greater diversification, some materials suppliers have reshuffled the landscape through M&A - i.e. Nissan Chemical’s acquisition of Thin Materials, which allowed Nissan Chemical to enter the temporary bonding materials field.
In the hopes of acquiring market share in other regions, recent acquisitions have transpired amongst materials suppliers aiming to expand their market reach: for example, Mactac America, which acquired Lintec Corp.

Others are already seasoned specialists in materials for microelectronics, and maintain their leadership role by consistently enhancing their product portfolio.

On the other hand, Chinese polymeric materials suppliers (i.e. Kempur) coming from the integrated circuit business are trying to penetrate the advanced packaging market by leveraging their materials line to meet current packaging requirements. Many of these new Chinese players, which still lack significant market share, benefit from strong subsidies offered by local governments. This could help them compete with the top players in the midterm.

Yole Développement’s report provides a map of the key polymeric materials involved in each polymeric material function and advanced packaging process step, as well as the material types offered. This report also provides quantified, detailed market share for major materials suppliers, segmented by process step and material functionality.

**OBJECTIVES OF THE REPORT**

- Detailed analysis of the major advanced packaging platforms using polymeric materials that could require the use of polymeric materials
- Polymeric materials roadmap for the advanced packaging platforms
- Give the current status of the polymeric material adoption and the various type of polymeric material available on the market
- Provide an overview of the technological trends for polymeric material
- Understand the key benefits and added value of the polymeric material in the field of advanced packaging
- How does polymeric material differ from the other alternative material solutions
- Understand what are the remaining challenges of the implementation of the polymeric material in the field of advanced packaging
- Offer market metrics at polymeric material market level for advanced packaging applications (2017-2023)
- Evaluate market developments in terms of market size (volume, value, quantity), by material function and by advanced packaging platform
- Provide a competitive landscape, identify key players in technology development and manufacturing
- Give an overview of who is doing what, and specificities of each market

**COMPANIES CITED IN THE REPORT (non exhaustive list)**

3M, AGC, AIT, Brewer Science, Britech, Cookson Electronics, Asahi Kasei, Denka, DOW, Dupont, Fujifilm, HD microsystems, Henkel, Hitachi Chemical, Kempur, Indium, Lintec, JSR Corporation, MacDermid, Nagase, Namics, Nippon Kayaku, Sekisui, Shin Etsu, Sumitomo Bakelite, Merck, Nissan Chemical Industries, Solvay, TOK, Toray, Zymet and more...

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- 2017 - 2023 global polymeric materials market forecast, in market value and units: split by advanced packaging platform and material function
- Update regarding key 2017 polymeric materials suppliers
- New analysis based on the competitive landscape and market share of polymeric materials suppliers, by material function

**AUTHOR**

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• Consulting & Financial Services: Jean-Christophe Eloy (eloy@yole.fr)
• Reports: David Jourdan (jourdan@yole.fr) Yole Group of Companies
• Press Relations & Corporate Communication: Sandrine Leroy (leroy@yole.fr)

(1) Our Terms and Conditions of Sale are available at www.yole.fr/Terms_and_Conditions_of_Sale.aspx
The present document is valid 24 months after its publishing date: November 8, 2018
1. SCOPE

1.1 The Contracting Parties undertake to observe the following general conditions when agreed by the Buyer and the Seller. ANY ADDITIONAL, DIFFERENT, OR CONFLICTING TERMS AND CONDITIONS IN ANY OTHER DOCUMENTS ISSUED BY THE BUYER AT ANY TIME ARE HEREBY OBJECTED TO BY THE SELLER, SHALL BE WHOLLY INAPPLICABLE TO ANY SALE MADE HEREUNDER AND OBJECTED TO BY THE SELLER, SHALL BE WHOLLY INAPPLICABLE TO ANY SALE MADE HEREUNDER AND SHALL NOT BE BINDING IN ANY WAY ON THE SELLER.

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Branch code: 00170
Account n°: 0170 200 1565 87
BIC or SWIFT code: CCFRRFRP
IBAN: FR76 3005 6001 7001 7025 4387
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8.1 All the provisions of these Terms and Conditions are for the benefit of the Seller, its licensors and the Seller’s customers and agents. Each of them is entitled to assert and enforce those provisions against the Buyer.

8.2 All these Terms and Conditions shall be given in writing. They shall be effective upon receipt by the other Party. The Seller may, from time to time, update these Terms and Conditions, and the Buyer shall be deemed to have accepted the latest version of these terms and conditions by providing any communication to him in due time.

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  - RF Acoustic Wave Filters 2017 – Patent Landscape Analysis
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