

# 化工全球系列报告之十四

## 环氧塑封料深度报告： 高端产品需求有望快速增长

### High-end Product Demand is Expected to Grow Rapidly

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# 投资要点

- **环氧塑封料是半导体产业的重要封装材料。**环氧塑封料是半导体工业中一种常用的塑封材料，由环氧树脂、固化剂、填料和助剂等组成，主要应用于电子元器件的封装和保护，例如集成电路、半导体器件、LED芯片、电源模块、电子变压器、传感器等。其优异的电气性能、机械性能和耐化学性能，可以使电子元器件具有良好的绝缘性、耐热性、耐腐蚀性和机械强度，有效地保护电子元器件不受潮湿、腐蚀和机械损伤的影响，从而提高电子元器件的可靠性和使用寿命。目前95%以上的电子元器件均采用环氧塑封料封装。
- **环氧塑封料国产替代空间较大。**国产环氧塑封料近年来进步迅速，在各种参数上积极追赶国外先进产品，目前已基本可以满足传统封装如DO、TO、SOT等领域的需求，但是在先进封装如QFN、BGA等领域，目前仅有少量销售，而在MUF/FOWLP等领域，国产目前尚处于布局阶段。随着半导体制程进步带来的对先进封装需求的不断增加，国产替代空间较大。
- **高端环氧塑封料是未来发展方向。**随着半导体制程的不断进步，半导体元器件对封装材料的要求越来越高，高端环氧塑封料的需求不断增加是必然的趋势。相较于适用于一般封装的中低端环氧塑封料，导热性能好、分布均匀、线性膨胀系数低、高耐湿、高耐热的高端环氧塑封料因可以满足大规模集成电路及先进制程芯片封装的需要而具有更高的增长潜力。
- **预期全球环氧塑封料市场2027年将可达99亿美元。**随着电动汽车及数据中心增长带来的对电子元器件需求的增长，我们预期2027年全球环氧塑封料市场将有望达到99亿美元，年均复合增长率约为5.0%。
- **环氧塑封料需求有望受益于ChatGPT的兴起。**ChatGPT的部署及训练需要大量的算力及存储空间，会带来对逻辑芯片及存储芯片的大量需求，尤其是对先进制程芯片的需求。作为半导体工业中重要封装材料的环氧塑封料，尤其是适用于先进制程封装的高端环氧塑封料，将有望受益。
- **重点公司。**日本公司目前仍在全球环氧塑封料市场占据主要地位，其市场份额及技术均较为领先，目前正紧跟下游产业需求，不断开发新技术及新产品，建议重点关注住友电木。
- **风险：**数据中心增速不及预期；半导体周期下行时间长于预期；车载电子增速不及预期

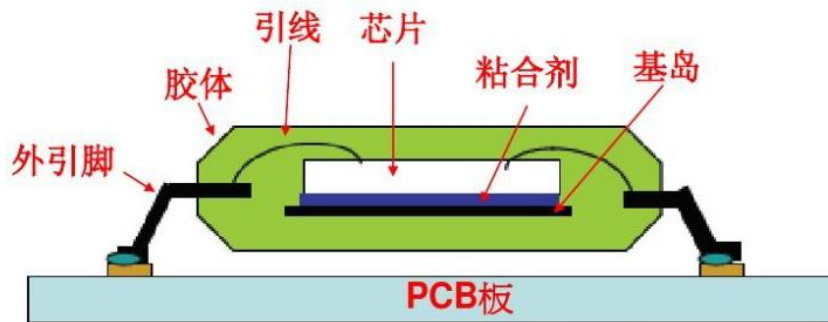
## 1.1 环氧塑封料：电子器件的主要封装材料

- 环氧塑封料是用于半导体封装的一种热固性化学材料，英文名Epoxy Molding Compound（EMC），是由环氧树脂为基体树脂，以高性能酚醛树脂为固化剂，加入硅微粉等为填料，以及添加多种助剂混配而成的粉状模塑料，为后道封装的主要原材料之一，目前95%以上的微电子器件都是环氧塑封器件。环氧塑封料具有保护芯片不受外界环境的影响，抵抗外部溶剂、湿气、冲击，保证芯片与外界环境电绝缘等功能。

图：环氧塑封料



图：环氧塑封料功能示意图



资料来源：长电科技，海通国际

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## 1.2 环氧密封胶料：硅微粉及树脂为主要成分

- 环氧密封胶料的主要组成成分可分为聚合物、填料、添加剂三类。聚合物主要包括环氧树脂、偶联剂、硬化剂等；填料主要由硅微粉和氧化铝充当；添加剂则主要包括脱模剂、染色剂、阻燃剂、应力添加剂、粘结剂等。各种成分中占比最大的两种为填料以及环氧树脂。

图：环氧密封胶料主要成分及功能

	组成成分	常用化合物	主要功能	重量占比
聚合物	环氧树脂	邻甲酚型、联苯型、多功能型树脂等	与硬化剂反应后提供交联结构	5%-10%
	偶联剂	硅氧烷、氨基硅油的等	增强有机物和无机物之间的结合	
	固化剂	酚醛树脂型、低吸水性等	与环氧树脂反应提供交联结构	5%-10%
填料	硅微粉、氧化铝	二氧化硅、三氧化二铝	提高强度、降低热膨胀系数、减少吸水性等	60%-90%
添加剂	脱模剂	天然蜡、合成蜡等	提供连续成形能力	<1%
	阻燃剂	非环保材：溴环氧树脂、三氧化二锑 环保材：金属氢氧化物等	阻燃	<10%
	催化剂	胍化物、磷化物	加速环氧树脂与硬化剂的反应	<1%
	其他（应力添加剂、染色剂、粘结剂等）	-	降低材料膨胀应力、染色、增强材料粘结力等	<1%

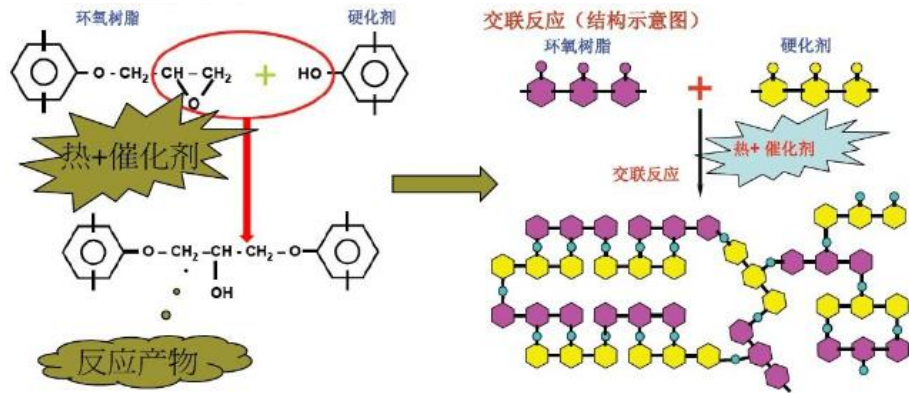
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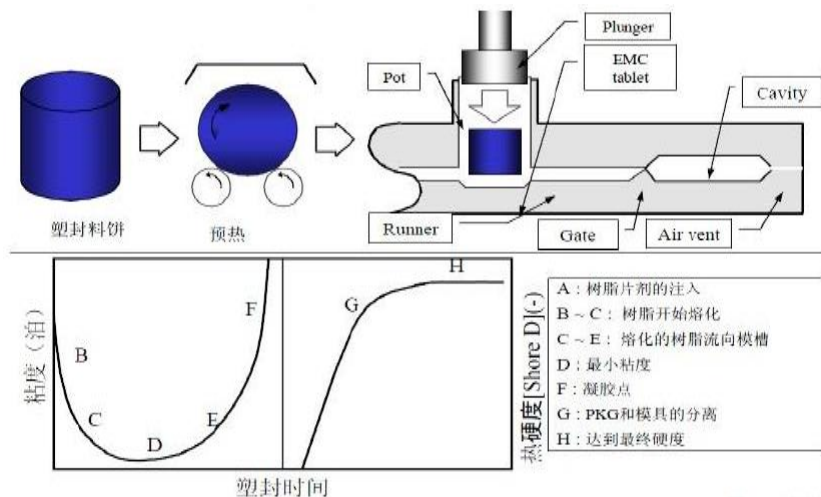
## 1.3 环氧塑封料：固化机理以交联反应为基础

- 使用环氧塑封料封装电子元器件一般采用传递成型法。该法将环氧塑封料挤压入模腔，并将其中的半导体芯片包埋，同时交联固化成型，成为具有一定结构外型的半导体器件。固化的机理为环氧树脂在加热以及催化剂的条件下同硬化剂发生交联反应，形成具有一定稳定架构的化合物。

图：环氧树脂固化机理



图：环氧塑封料注塑过程



资料来源：长电科技，海通国际

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## 1.4 环氧塑封料：成型常见问题有充填不良、气孔等

- 由于环氧塑封料性能、使用模具、封装工艺等问题，环氧塑封料在封装成型中常见问题包括充填不良、气孔、麻点、溢料、流痕、黏模、开裂、冲线、分层等。塑封成型的常见问题很多，发生的几率和位置有很大差异，产生的原因也比较复杂，并经常互相牵连，互相影响。

表：EMC封装成型问题相关因素

关联因素	备注
EMC性能	胶化时间、黏度、流动性、脱模性、粘结性、耐湿性、耐热性、溢料性、应力、强度、模量等
模具	浇道、浇口、型腔、排气口设计与引线框架设计的匹配程度等
封装工艺	合模压力、注塑压力、注塑速度、预热温度、模具温度、固化时间等
其他	人员操作/成型机台及周边设备状况

表：塑封成型常见问题及原因

常见问题	描述	可能原因
充填不良	塑封料不能完全覆盖整个元器件	因储存/使用不当或过期导致EMC流动性下降；EMC所用硅微粉粒度过粗
气孔	塑封完成后出现孔洞	成型工艺与所用EMC性能不匹配
麻点	封装成型后表面出现大量微小气孔	料饼预热过程中受热不均
溢料	封装成型后出现塑封料溢出	EMC黏度过低或硅微粉粒度分布不合理；模具表面磨损或成型机基座不平整
流痕	塑封完成后表现出现流动痕迹	离型剂添加过量或混合不均；离型剂局部累积在模具表面
黏模	塑封完成后模具中出现大量残留塑封料	成型工艺与所用EMC性能不匹配；模具表面脏污；EMC脱模性较差
开裂	封装成型后表面出现裂痕	各材料间膨胀系数不匹配；EMC吸湿
冲线	塑封料使得元器件线路扭曲	EMC流动不均匀；气泡导致内部应力变化；EMC中硅微粉粒度过大

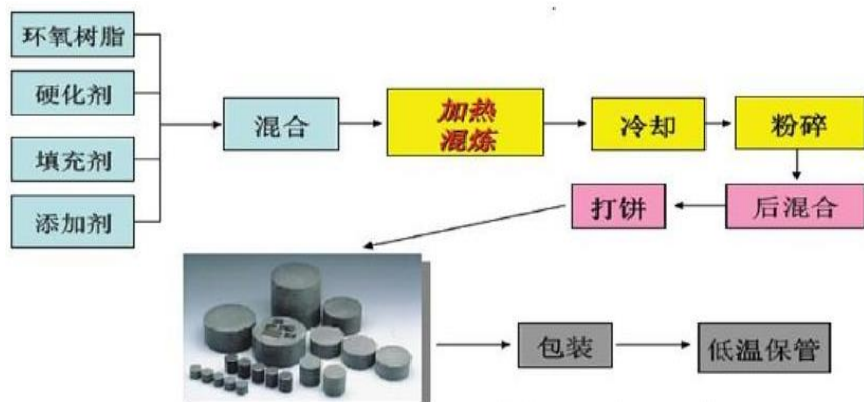
资料来源：长春集团，海通国际

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## 1.5 环氧塑封料：配方及工艺是关键

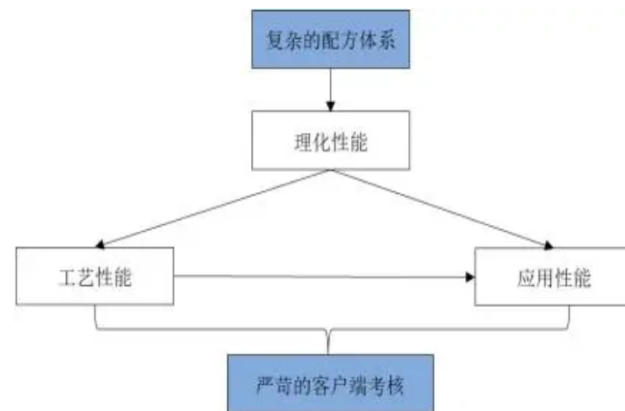
- 环氧塑封料的生产首先将环氧树脂、硬化剂、填充剂、添加剂等原材料按照一定比例混合，之后经过加热混炼、冷却、粉碎、后混合、打饼等环节形成成品，之后经过包装环节进行低温保管。环氧塑封料产品品质主要由理化性能、工艺性能以及应用性决定，而下游客户则主要对环氧塑封料产品的工艺性能与应用性能进行考核验证。其中，产品配方直接决定了理化性能，进而影响到工艺性能与应用性能。因此，环氧塑封料厂商的研发重点主要系产品配方的完善、优化与开发，且大量与配方相关的核心知识产权需要通过注册专利的形式予以保护。

图：环氧塑封料生产过程



资料来源：长电科技，中科院，海通国际

图：环氧塑封料厂商关注重点



## 1.5 环氧塑封料：配方及工艺是关键

- ▶ 随着半导体制程的进步及芯片进一步朝向高集成度与多功能化的方向发展，环氧塑封料厂商需要针对性地开发新产品以匹配下游客户日益复杂的性能需求，因而应用于历代封装形式的各类产品的配方开发（主要涉及原材料选择与配比）、生产中的加料顺序、混炼温度、混炼时间、搅拌速度等工艺参数均存有所不同，即各类产品在理化性能、工艺性能以及应用性能等方面均存在差异，需要厂商长期的技术积累及持续的研发投入才可应对。

表：历代封装技术对环氧塑封料的要求

封装技术阶段	封装形式	性能要求	对应产品
第一阶段	TO、DIP等	重点考察环氧塑封料的热性能与电性能，要求在配方设计中关注固化时间、T <sub>g</sub> 、CTE、导热系数、离子含量、气孔率等因素	基础类环氧塑封料
第二阶段	SOT、SOP等	重点考察环氧塑封料的可靠性、连续模塑性等性能，要求在配方设计中关注冲丝率、固化时间、流动性、离子含量、吸水率、粘接力、弯曲强度、弯曲模量等因素	高性能类环氧塑封料
第三阶段	QFN、BGA等	重点考察环氧塑封料的翘曲、可靠性、气孔等性能，要求在配方设计中关注流动性、粘度、弯曲强度、弯曲模量、T <sub>g</sub> 、CTE、应力、吸水率、粘接力等因素	先进封装类环氧塑封料
第四、五阶段	SIP、FOWLP等	对环氧塑封料的翘曲、可靠性、气孔提出了更高要求，部分产品以颗粒状或液态形式呈现，要求在配方设计中关注粘度、粘接力、吸水率、弯曲强度、弯曲模量、T <sub>g</sub> 、CTE、离子含量、颗粒状材料的大小等因素	先进封装类环氧塑封料

资料来源：中科院，海通国际

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## 1.6 环氧塑封料：需通过多项下游验证

- ▶ 半导体封装材料产品需要通过下游客户的样品考核验证及批量验证后才能获得客户的使用。目前下游封装厂商主要参考 JEDEC（固态技术协会）标准进行封装体的评估和测试，JEDEC标准对封装和测试服务制定了详细的考核项目和量化指标，包括潮敏等级试验（MSL）、高低温循环试验（TCT）、高压蒸煮试验（PCT）等。其中，MSL试验是针对环氧塑封料可靠性的主要考核项目。

表：环氧塑封料产品主要验证项目

考核项目	考核条件	参考标准	对产品的要求
潮敏等级实验 (MSL)	一般考核要求为MSL3: 125摄氏度条件下烘烤24小时; 30摄氏度、60%湿度条件下吸湿192小时; 三次回流, 峰值温度为260摄氏度	IPC/JEDEC J-STD-020	要求半导体封装材料不会由于应力过高而出现与芯片、基岛、导电胶或者框架分层或开裂、离子含量过高而使得芯片电性能失效等情况
高低温循环实验 (TCT)	在零下65摄氏度 (15分钟) 至150摄氏度 (15分钟) 环境下, 循环500次	JESD22-A104	要求半导体封装材料不会由于应力过高造成半导体元器件内部出现分层、开裂等现象
强加速湿热实验 (HAST)	在温度130摄氏度、湿度85%条件下, 实验500小时	JESD22-A118	要求半导体材料不会由于离子含量过高、电导率过高造成芯片表面与引线之间焊点的脱落而造成电性能失效
高压蒸煮实验 (PCT)	温度121摄氏度、湿度100%、两个标准大气压下实验96~168小时	JESD22-A102	要求环氧塑封料不会由于高温下的粘结对过低造成半导体元器件内部出现分层现象
高温高湿实验 (THT)	在温度85摄氏度、湿度85%条件下, 实验500小时	JESD22-A101	要求半导体封装材料不会由于离子含量过高、PH过低造成引线腐蚀或者焊点脱落, 致使元器件电性能失效
高温贮存实验 (HTST)	在150摄氏度条件下实验500小时	JESD22-A103	要求半导体封装材料不会由于耐热性不良、高温粘接力弱造成半导体器件内部分层或电性能失效

资料来源：固态技术协会，海通国际

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## 1.7 环氧塑封料：中国同世界先进水平依然有差距

- 近年来，中国半导体封装材料产业发展在一些领域取得了较大突破，但整体与外资厂商仍存在一定的差距。目前日本、美国厂商在中高端产品中仍占有较大份额，中国厂商仍主要以满足中国国内需求为主，出口量较小，且大部分仍集中在分立器件和中小规模集成电路封装用的环氧塑封料领域。目前中国产环氧塑封料（包含台资厂商）市场占比约为30%左右，而高端环氧塑封料产品基本被日美产品垄断。

表：国内外环氧塑封料应用对比

产品应用类型	封装技术类型	日美产品	中国产品	产品类型
DO/DIP/SMX/桥块	传统封装	已基本退出	主导地位	基础类环氧塑封料
TO	传统封装	基本相当	基本相当	基础类环氧塑封料
SOT/SOP/SOD	传统封装	主导地位，在高电压应用等细分领域较为领先	近年来发展迅速，在常规应用领域基本已经可以替代日本产品	高性能类环氧塑封料
QFN、BGA	先进封装	垄断地位	少量销售	先进封装类环氧塑封料
MUF/FOWLP	先进封装	垄断地位	尚处于布局阶段	先进封装类环氧塑封料

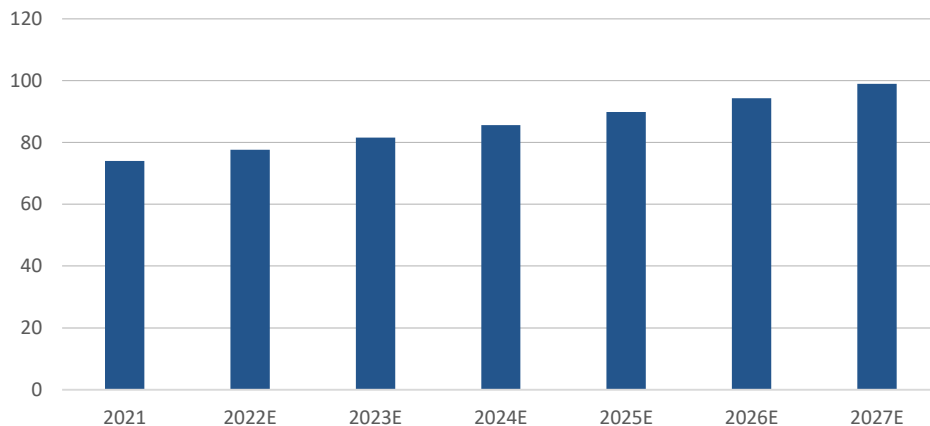
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## 1.8 全球环氧塑封料市场规模2027年有望达到99亿美元

- 受益于电动车及数据中心用电子元器件需求的快速增长，作为半导体封装的不可或缺的材料，环氧塑封料市场规模有望不断增长。根据市场研究机构Mordor Intelligence的数据，2021年全球环氧塑封料市场规模约为74亿美元，预计到2027年有望增长至99亿美元，年均复合增长率5.0%。

图：全球环氧塑封料市场规模（亿美元）



数据来源：Mordor Intelligence、海通国际

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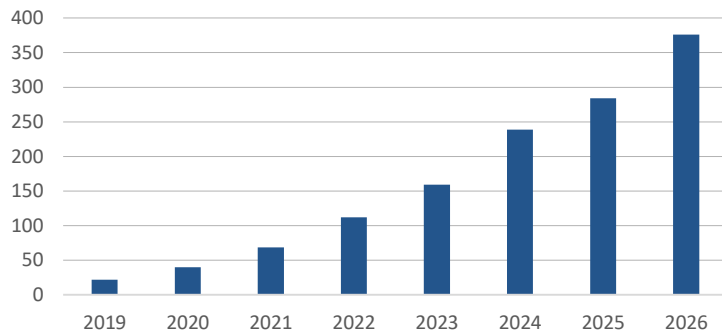
## 1.9 ChatGPT会带来对环氧塑封料的增量需求

- ChatGPT的发布给受困于消费电子下行的全球半导体业带来了新的增长动能。部署ChatGPT需要大量的算力以及存储空间，而且随着模型的迭代，对算力及存储空间的需求更是呈指数级增长。GPT、GPT-2和GPT-3的预训练数据量从5GB增加到45TB，GPT-3.5在训练中的总算力消耗则达到了3640PF-days，需要1万个高性能V100 GPU组成的高性能网络集群提供算力支撑。根据Omdia的数据，AI处理器的市场规模有望在2026年达到376亿美元，相对于2019年将飙升9倍，而ChatGPT带来的对存储芯片的增量需求也相当可观。由于环氧塑封料均是芯片封装中不可或缺的材料，预期将受益于ChatGPT带来的对半导体芯片的增量需求。

表：历代GPT模型参数

模型	发布时间	参数量	预训练数据量
GPT	2018年6月	1.17亿	约5GB
GPT-2	2019年2月	15亿	40GB
GPT-2	2020年5月	1750亿	45TB

图：AI处理器市场规模预测（亿美元）



资料来源：微软、Omdia、海通国际

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## 2.1 全球重点相关公司汇总

公司	21年收入 (亿元)	相关产品营收 占比	总市值 (亿元)	EBITDA (亿元)			EV/EBITDA		
				2021	2022	2023	2021	2022	2023
住友电木	136	约23%	95	16.7	19.8	20.5	6.1	5.2	4.3
Resonac	722	约3%	190	105.0	87.6	75.8	8.0	8.0	8.9

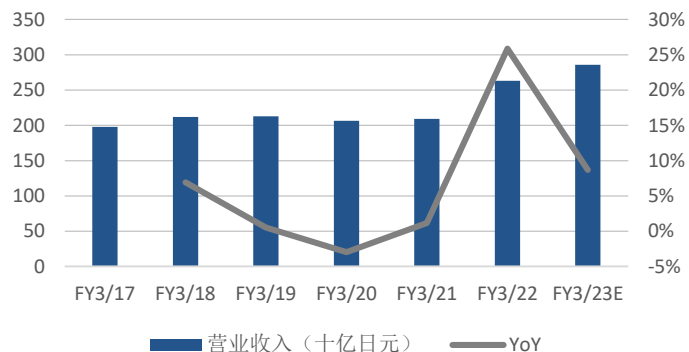
数据来源：公司公告、彭博、海通国际

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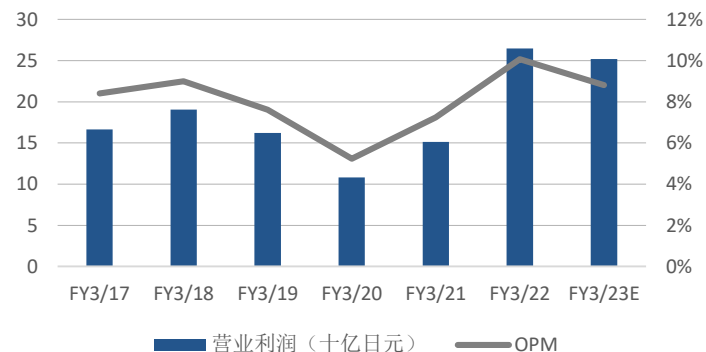
## 2.1.1 住友电木：全球环氧塑封料领军企业

- 住友电木（4203.JP）是一家总部位于日本东京的化学工业公司，成立于1913年。该公司主要从事塑料、电子材料、化学材料等领域的研发、生产和销售。住友电木的环氧塑封料业务目前全球市场份额约40%左右，排名世界第一。2022年3月财年，公司营业收入为2631亿日元，同比增长25.9%；营业利润265亿日元，同比增加59.2%，营业利润率为9.8%。公司预计，2023年3月财年营收为2860亿日元，同比增加8.7%，营业利润252亿日元，同比减少4.9%，营业利润率8.8%。

图：营收及增长率



图：营业利润及营业利润率



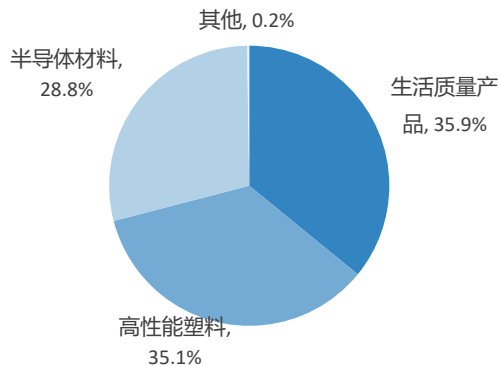
数据来源：公司公告、彭博、海通国际

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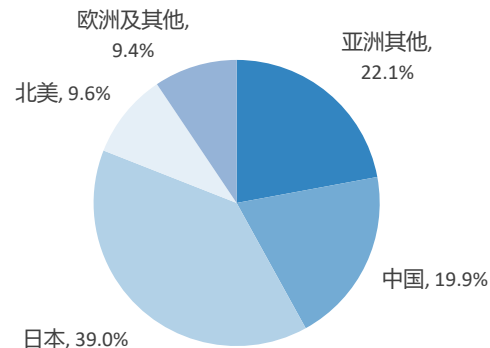
## 2.1.1 住友电木：全球环氧塑封料领军企业

- 住友电木目前将业务分为三个板块：半导体材料、高性能塑料、生活质量产品，其中半导体材料板块营收主要来自于环氧塑封料业务。该板块营收2022年3月财年占比仅约29%，但营业利润占比却达到了55%，是住友电木营业利润率最高的板块。按地域来看，帝人来自于日本国内的营收占比最高，约39%；来自中国的营收占比约为20%，排行第二；来自亚洲其余地区、北美、欧洲及其他的营收占比分别为22%、10%、9%。

图：营业收入按业务划分（FY3/22）



图：营业收入按地域划分（FY3/22）



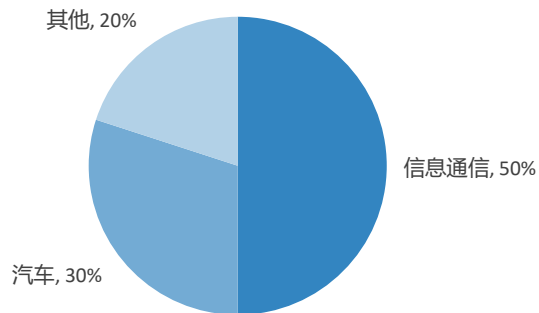
数据来源：公司公告、彭博、海通国际

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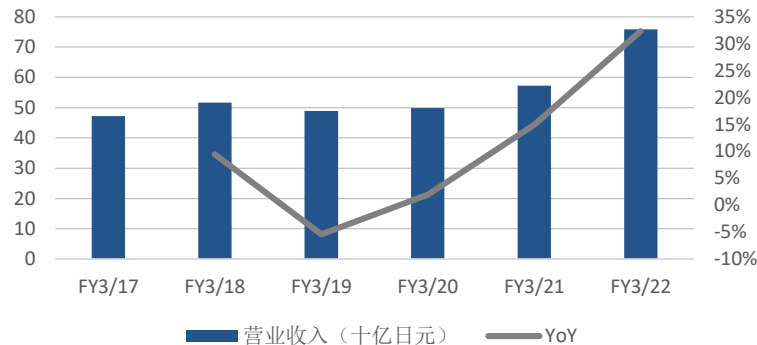
## 2.1.1 住友电木：全球环氧塑封料领军企业

- 按下游应用领域，住友电木的环氧塑封料业务可划分为三块：信息通信（包括智能手机、PC、服务器等）、汽车、其他，三块营收比例大致为50%、30%、20%，可以看出住友电木环氧塑封料业务目前仍对消费电子依赖程度较高。2022年3月财年住友电木半导体材料板块营收758亿日元，同比增长32%，五年复合年均增长率9.9%；营业利润165亿日元，同比增长75%，五年复合年均增长率17.3%。

图：环氧塑封料业务营业收入按下游领域划分



图：半导体材料业务营业收入及增长率



数据来源：公司公告、彭博、海通国际

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## 2.1.1 住友电木：全球环氧塑封料领军企业

- 公司未来战略拟围绕五点展开：1) 增强中国及中国台湾地区的生产能力，以应对两地日益增加的需求；2) 开发面向5G/DX时代的高性能材料，如用于高速、大容量通信的高导热性模具底部填充材料；3) 建立稳定的原材料采购及成本转嫁机制；4) 围绕三种产品（电机磁铁固定材料、ECU批量密封材料及功率模块材料）开展电动车相关业务；5) 基于同车企建立的关系，积极合作开发面向下一代的材料。

表：住友电木环氧塑封料业务SWOT分析

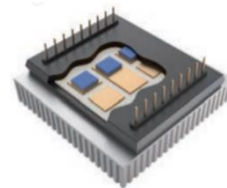
	描述
优势 (S)	在半导体封装材料领域拥有世界第一的市场份额；集生产、销售、研发于一体的全球业务结构；在材料、工艺、评估方面的高技术；业界的口碑与信任
劣势 (W)	对市场的波动较为敏感；对特定产品依赖程度过高
机会 (O)	汽车业向电动车的转变；物联网以及5G的发展；智能、节能社会的建设以及环保力度的加大；远程办公的增加扩大了对信息及通信设备的需求
威胁 (T)	中美贸易摩擦带来的不确定性；产品竞争的加剧；原材料价格的上涨

图：住友电木环氧塑封料业务的战略产品

电机磁铁固定材料



功率模块材料



ECU批量密封材料



数据来源：公司公告、海通国际

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## 2.1.2 Resonac: 积极扩大公司环氧塑封料在高端领域中的应用

- Resonac (4004.JP) 由昭和电工与日立化成合并而成, 业务涉及多个领域, 包括化学品、电子材料、石油和天然气、金属、建材、航空航天等。公司的产品和服务广泛应用于电子、汽车、能源、建筑等行业。2022年12月财年, 公司营业收入为13926亿日元, 同比降低-1.9%; 营业利润594亿日元, 同比减少31.9%, 营业利润率为4.3%。

图: 营收及增长率

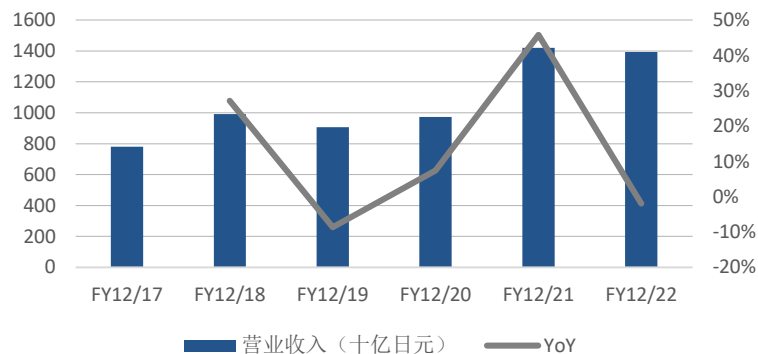
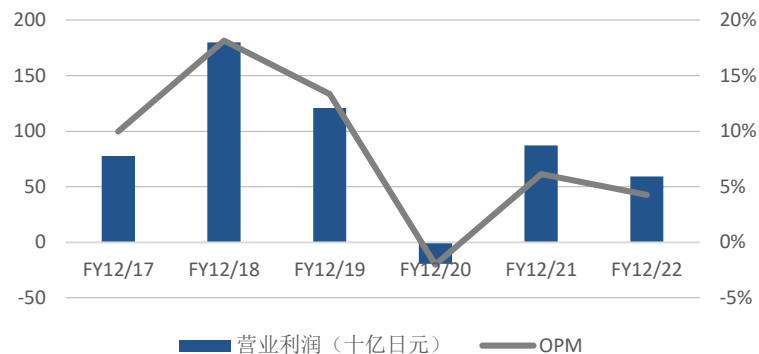


图: 营业利润及营业利润率



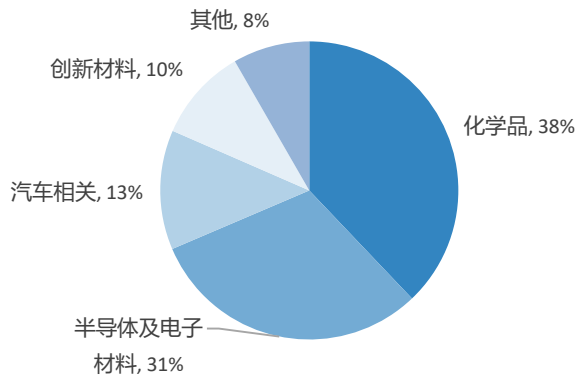
数据来源: 公司公告、彭博、海通国际

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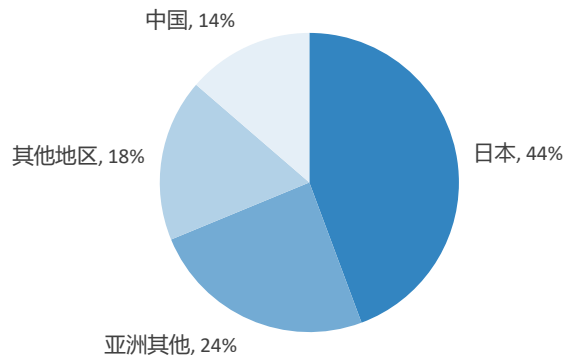
## 2.1.2 Resonac: 积极扩大公司环氧塑封料在高端领域中的应用

- Resonac目前将业务分为四个板块：半导体及电子材料、汽车相关、创新材料及化学品。环氧塑封料业务被划归为半导体及电子材料板块，该板块营收2022年12月财年占比约31%，是Resonac营收占比第二大的业务板块。按地域来看，Resonac有44%的营收来自于日本国内；除日本及中国以外的亚洲地区是公司收入来源的第二大市场，占比24%；来自中国的收入占比约14%；其他地区占比约18%。

图：营业收入按业务划分（FY12/22）



图：营业收入按地域划分（FY3/22）



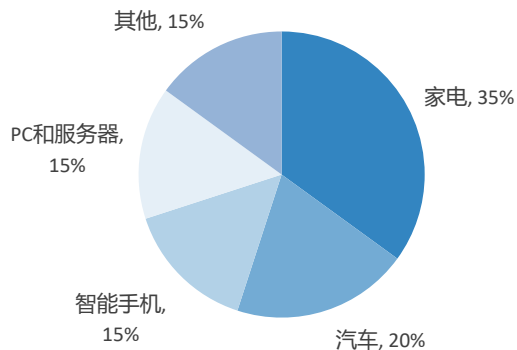
数据来源：公司公告、彭博、海通国际

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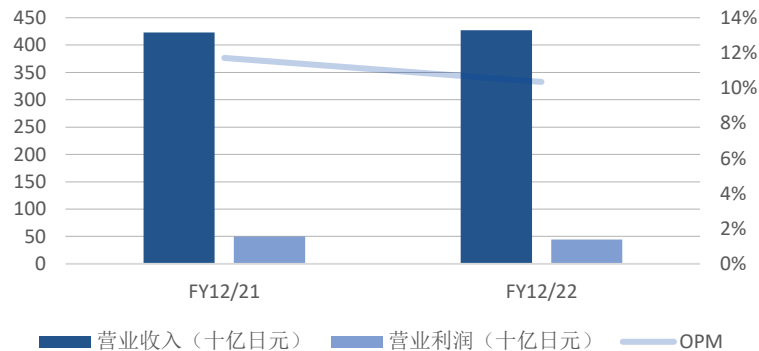
## 2.1.2 Resonac: 积极扩大公司环氧塑封料在高端领域中的应用

- 按下游应用领域，Resonac的环氧塑封料业务可划分为五块：家电、汽车、智能手机、PC和服务器、其他，五块营收比例大致为35%、20%、15%、15%、15%，中低端的家电用环氧塑封料占公司业务的营收比例依然较大。公司半导体及电子材料板块2022年12月财年营收4272亿日元，同比上一财年增长1%；营业利润442亿日元，同比上一财年降低10.8%。

图：环氧塑封料业务营业收入按下游领域划分



图：半导体及电子材料板块营收、营利及营业利润率



数据来源：公司公告、彭博、海通国际

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## 2.1.2 Resonac: 积极扩大公司环氧塑封料在高端领域中的应用

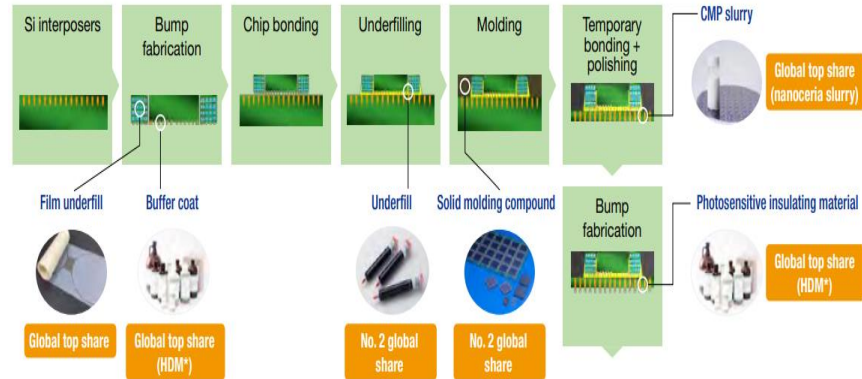
- Resonac关于其环氧塑封料业务的战略主要有：1) 结合公司在半导体领域的其他优势技术，着力提高公司产品在处理器、内存等高端领域的市场份额；2) 把握电动汽车销量增长的机遇，继续扩大公司产品在电动汽车领域中的应用；3) 紧跟下游市场需求，积极开发新产品，利用公司覆盖后端半导体工程全流程的能力，为客户提供一揽子的解决方案。

图：Resonac半导体关联产品在生活中应用



数据来源：公司公告、海通国际

图：Resonac后端半导体工程相关材料



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- Epoxy molding compound is an important packaging material for semiconductor industry. It is a common encapsulation material in the semiconductor industry, consisting of epoxy resin, curing agent, filler and additives, etc. It is mainly used in the encapsulation and protection of electronic components, such as integrated circuits, semiconductor devices, LED chips, power supply modules, electronic transformers, sensors, etc. Its excellent electrical properties, mechanical properties and chemical resistance can make electronic components have good insulation, heat resistance, corrosion resistance and mechanical strength. Its excellent electrical properties, mechanical properties and chemical resistance can make electronic components have good insulation, heat resistance, corrosion resistance and mechanical strength, effectively protecting electronic components from moisture, corrosion and mechanical damage, thus improving the reliability and service life of electronic components. At present, more than 95% of electronic components are encapsulated with epoxy molding compound.
- There is more room for Chinese replacement of epoxy molding compound. In recent years, Chinese made epoxy molding compound has been making rapid progress and actively catching up with foreign advanced products in various parameters, which can basically meet the demand of traditional packages such as DO, TO, SOT, etc. However, in the field of advanced packages such as QFN, BGA, etc., there are only a few sales at present, while in the field of MUF/FOWLP, etc., Chinese made is still in the layout stage. With the increasing demand for advanced packages brought by the progress of semiconductor process, there is more room for Chinese replacement.
- High-end epoxy molding compound is the future development direction. With the continuous progress of semiconductor process, the demand for packaging materials for semiconductor components is getting higher and higher, and the demand for high-end epoxy molding compound is inevitably increasing. Compared with low-end epoxy molding compound for general packaging, high-end epoxy molding compound with good thermal conductivity, uniform distribution, low linear expansion coefficient, high humidity resistance and high heat resistance have higher growth potential because they can meet the needs of large-scale integrated circuits and advanced process chip packaging.
- The global epoxy molding compound market is expected to reach \$9.9 billion by 2027. With the growing demand for electronic components due to the growth of electric vehicles and data centers, we expect the global epoxy plastic sealant market to reach \$9.9 billion in 2027, growing at a CAGR of approximately 5.0%.
- The demand for epoxy molding compound is expected to benefit from the rise of ChatGPT, which requires large amount of computing power and storage space for its deployment and training, resulting in a large demand for logic chips and storage chips, especially for advanced process chips. As an important packaging material in the semiconductor industry, epoxy molding compound, especially high-end epoxy epoxy molding compound for advanced process packaging, are expected to benefit.
- Key companies. Japanese companies still occupy a major position in the high-end silicon powder market, its market share and technology are more advanced, is now closely following the needs of the downstream industry, and continue to develop new technologies and new products. We suggest to eyes on Sumitomo Bakelite.
- Risks: Growth rate of data center is less than expected; Time of semiconductor cyclical downturn is longer than expected; Growth rate of electronics for EV is less than expected.

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**弱于大市**，未来12-18个月内预期相对基准指数跌幅在10%以上，基准定义如下

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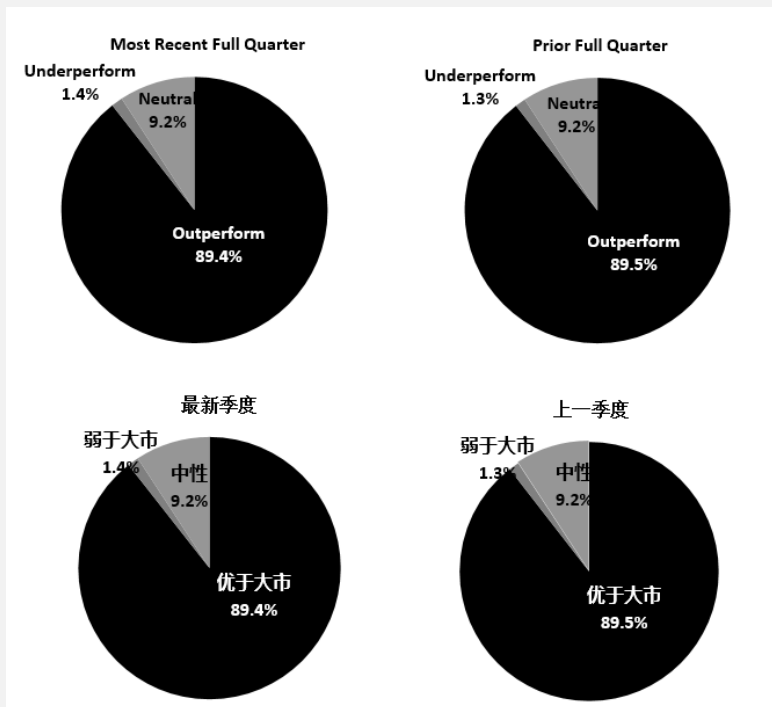
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## 截至2022年9月30日海通国际股票研究评级分布

	优于大市	中性 (持有)	弱于大市
海通国际股票研究覆盖率	89.4%	9.2%	1.4%
投资银行客户*	5.5%	6.8%	4.5%

\*在每个评级类别里投资银行客户所占的百分比。

上述分布中的买入，中性和卖出分别对应我们当前优于大市，中性和落后大市评级。

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IB clients*	5.5%	6.8%	4.5%

\*Percentage of investment banking clients in each rating category.

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