OLED 下游需求持续增长，终端材料逐步实现进口替代

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投资要点：

- **OLED 面板应用领域逐步拓展，市场规模持续增长。**OLED 主要终端应用领域为手机和电视产品，智能可穿戴领域等新兴市场将推动 OLED 市场规模增长，根据维信诺发行股份及支付现金购买资产并募集配套资金暨关联交易报告书（草案）（修订稿）援引 Omdia 数据，2021 年全球 AMOLED 显示面板销售额为 420 亿美元，预计 2025 年可达到 547 亿美元，年复合增长率达到 6.8%。

- **国内 OLED 面板市场占有率逐步提升。**全球 OLED 面板行业中，以三星、LGD 为代表的韩国企业凭借其在 OLED 方面先发优势和部分技术优势，目前仍占据了全球的主导地位。2019 年以来，国内企业投建产能逐步释放，OLED 产品出货量稳步提升，随着中国大陆企业产能扩建和良率爬升，预计未来国内 OLED 产品市场占有率将进一步提升。

- **下游需求带动 OLED 材料市场持续增长。**根据不特定对象发行可转换公司债券募集说明书（上会稿）援引 Omdia 数据，2020 年全球 OLED 市场对显示材料的需求量为 88.47 吨，2021 年为 117.39 吨，同比增长 32.68%。随着 OLED 材料市场应用量的不断增长，其产品价格处于下降趋势。2020 年 OLED 终端材料的市场规模约为 12.95 亿美元，2022 年增至约 15.67 亿美元，增幅约 20.96%。

- **OLED 终端材料技术壁垒高，逐步实现进口替代。**国外 OLED 有机材料的研究和产业化起步早，具有先发优势，但近年来 OLED 有机材料厂商通过技术研发等途径逐步打破了国外的专利垄断，实现了 OLED 终端材料专利产品从 0 到 1 的突破。凭借优异的产品性能、成本、服务优势，国内 OLED 终端材料厂商逐步进入国内 OLED 面板厂商的供应链体系。

- **投资建议。**我们认为随着 OLED 终端应用领域的拓展推动市场规模持续增长，OLED 终端材料市场需求增加，国内 OLED 终端材料厂商逐步进入供应链体系，将逐步实现进口替代。建议关注 OLED 材料相关公司奥来德、莱特光电、万润股份、濮阳惠成等。

- **风险提示。**下游需求景气度低于预期；新建项目进度低于预期的风险；产品价格下跌风险。

行业相关股票

股票代码	股票名称	EPS（元）			投资评级	
		2022	2023E	2024E	上期	本期
002643	万润股份	0.78	0.83	0.90	优于大市	优于大市

资料来源：Wind，HTI

目 录

图目录

表目录

1. OLED 作为新型显示技术市场规模持续增长

1.1 OLED 市场规模持续增长

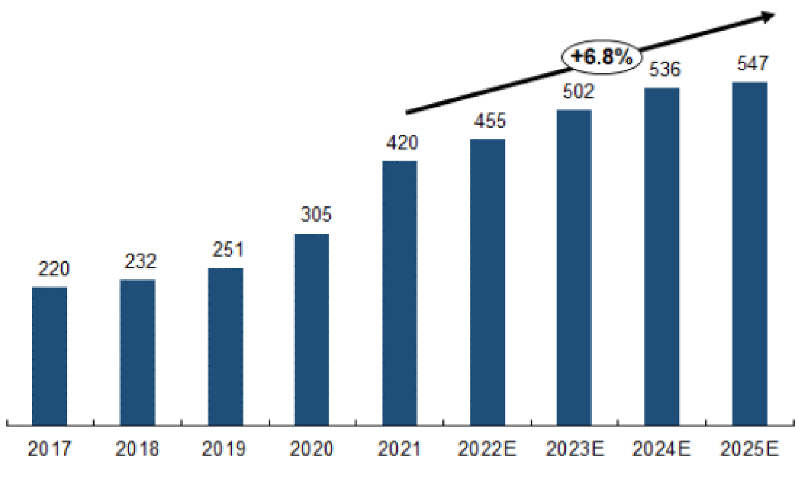
OLED 作为新型显示技术市场规模持续增长。由于 OLED 面板构造相对简单，因此在重量、厚度上相对 TFT-LCD 面板更轻、更薄，且 OLED 的材料特性使得其可以实现柔性显示和透明显示。因此，在智能手机市场及一些新兴应用领域如可穿戴电子设备（VR 设备，智能手表等）上，OLED 面板正逐渐取代 TFT-LCD 面板成为设备制造商的新选择。根据维信诺发行股份及支付现金购买资产并募集配套资金暨关联交易报告书（草案）（修订稿）援引 Omdia 数据，2021 年全球 AMOLED 显示面板销售额为 420 亿美元，预计 2025 年可达到 547 亿美元，年复合增长率达到 6.8%。

表 1 TFT-LCD 面板和 OLED 面板具有不同的产品特性

特性	TFT-LCD	OLED
柔性显示	不可能	可能
透明显示	可能	可能，更易实现
响应速度	1ms	20μs
视角	170	180
色彩饱和度	60%-90%	110%
工作温度	-20℃~70℃	-40℃~85℃
对比度	1500：1	200 万：1
发光方式	被动发光（需背光）	固态自然光
厚薄	2.0mm	<1.5mm
耐撞击	承受能力差	承受能力强

资料来源：招股书，HTI

图1 2017-2025 年全球 AMOLED 显示面板销售额（亿美元）

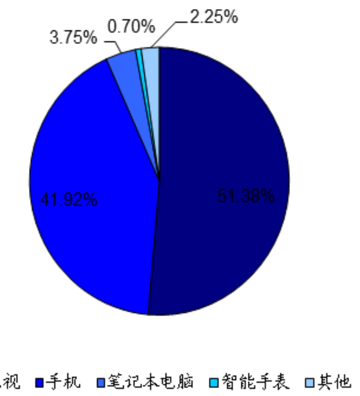


资料来源：Omdia，维信诺科技股份有限公司发行股份及支付现金购买资产并募集配套资金暨关联交易报告书（草案）（修订稿），HTI

1.2 OLED 面板应用领域逐步拓展

OLED 面板应用领域正在逐步拓展。AMOLED 显示面板的主要终端应用领域为手机和电视产品，OLED 技术凭借其柔性、轻薄、窄边框、高画质等优势，有望在 IT 领域广泛应用，车载显示领域目前也是面板厂商布局的重点。根据不特定对象发行可转换公司债券募集说明书（上会稿）援引 Omdia，2022 年电视和手机 OLED 面板的出货面积分别为 725.24、591.65 万平方米。

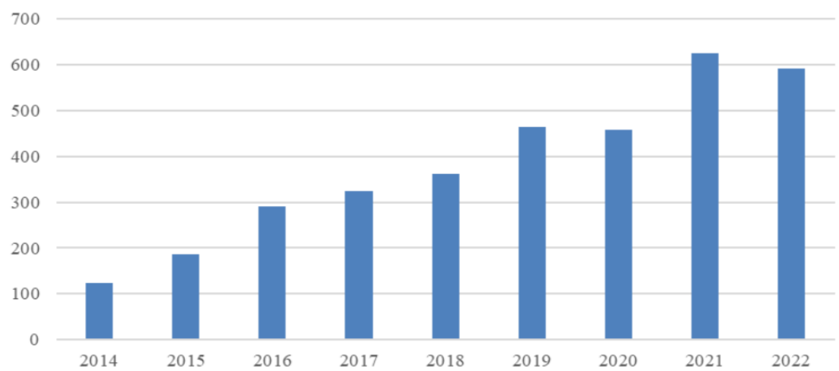
图2 2022 年 AMOLED 市场终端应用结构



资料来源：Omdia，不特定对象发行可转换公司债券募集说明书（上会稿），HTI

手机方面，OLED 面板逐渐从高端机型加速向中低端机型渗透。2010 年，三星凭借面板和手机整机一体化的产业链优势，率先在其旗舰产品 Galaxy S 上使用了 AMOLED 屏幕。2017 年，苹果推出了其首款 OLED 手机 iPhoneX，加速了 AMOLED 显示在手机终端的应用，华为、OPPO、小米等国产手机品牌纷纷推出各自的 OLED 机型，AMOLED 面板在手机端的出货面积持续增长。根据不特定对象发行可转换公司债券募集说明书援引 Omdia 数据，2014 年至 2022 年，全球手机 AMOLED 面板的出货面积由 122.78 万平方米增至 591.65 万平方米，复合增长率为 21.72%。随着 OLED 技术的成熟和成本下降，OLED 手机面板逐渐从高端机型加速向中低端机型渗透。

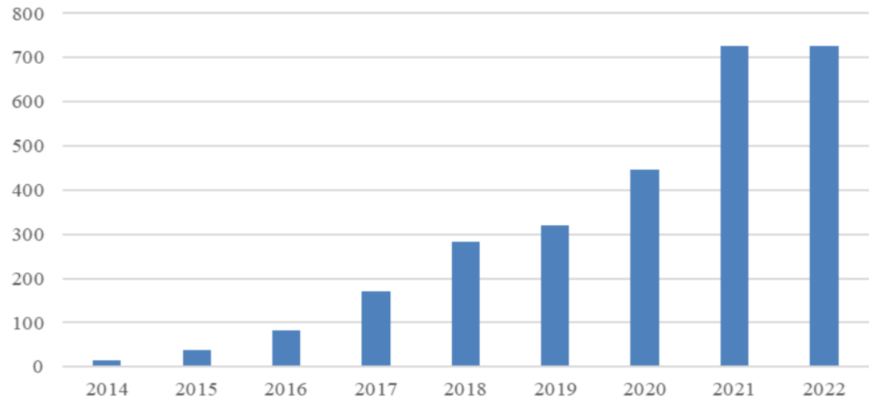
图3 手机 AMOLED 面板出货面积（万平方米）



资料来源：Omdia，不特定对象发行可转换公司债券募集说明书（上会稿），HTI

电视是 OLED 显示的另一主要终端应用市场。受限于良品率爬坡、价格偏高、产能不足等原因，OLED 显示技术在电视等大尺寸屏幕产品上短时间内难以实现对 TFT-LCD 显示技术的取代。但随着三星、LG 及国内主要面板厂商的持续投入，高世代产线实现规模化生产、大尺寸 OLED 面板良品率不断爬升，AMOLED 显示面板在电视端的渗透率呈上升趋势，带动了 AMOLED 显示面板在电视端出货面积的持续增长。根据不特定对象发行可转换公司债券募集说明书援引 Omdia，2014 年至 2022 年，全球电视端 AMOLED 面板的出货面积由 14.4 万平方米增至 725.24 万平方米，复合增长率达到 63.22%。

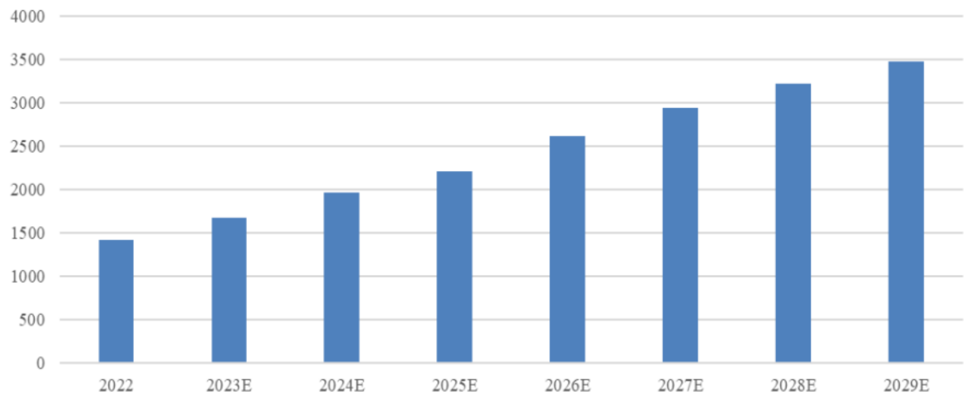
图4 电视 AMOLED 面板出货面积（万平方米）



资料来源：Omdia，不特定对象发行可转换公司债券募集说明书（上会稿），HTI

智能手表、VR 设备等智能可穿戴领域带动 OLED 市场规模不断增长。根据不特定对象发行可转换公司债券募集说明书援引 Omdia 的预计，2023 年 AMOLED 显示面板在智能手表领域的市场规模将达到约 31.29 亿美元，新兴市场的需求增长将带动 AMOLED 显示面板市场规模的不断增长。根据不特定对象发行可转换公司债券募集说明书援引 Omdia，2022 年至 2029 年，AMOLED 显示面板的出货面积预计将从 1411.54 万平方米增至 3470.76 万平方米，复合增长率达到 13.72%。

图5 AMOLED 面板出货面积预测（万平方米）

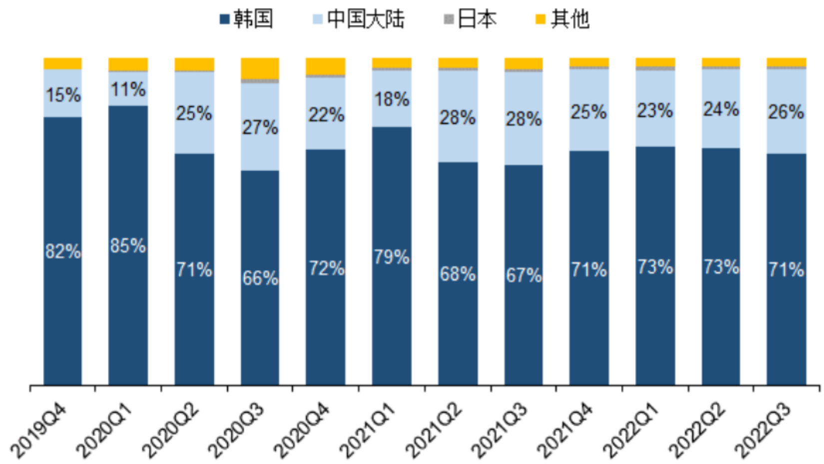


资料来源：Omdia，不特定对象发行可转换公司债券募集说明书（上会稿），HTI

1.3 国内 OLED 面板市占率逐步提升

韩国仍占出货主导地位，国内市占率进一步提升。全球 OLED 面板行业中，以三星、LGD 为代表的韩国企业凭借其在 OLED 方面先发优势和部分技术优势，目前仍占据了全球的主导地位。根据维信诺发行股份及支付现金购买资产并募集配套资金暨关联交易报告书援引 Omdia 数据，从地区分布来看，2022Q3 韩国企业市场份额占比 71%，中国大陆占比 26%。2019 年以来，随着京东方、维信诺为代表的中国大陆企业投建产能的逐步释放，中国大陆企业 OLED 产品出货量稳步提升。随着国内对于半导体核心环节自主可控的重视程度提升，中国大陆企业产能扩建和良率爬升，预计中国大陆企业 OLED 产品市场占有率将进一步提升。

图6 全球 OLED 厂商竞争格局（出货量口径）



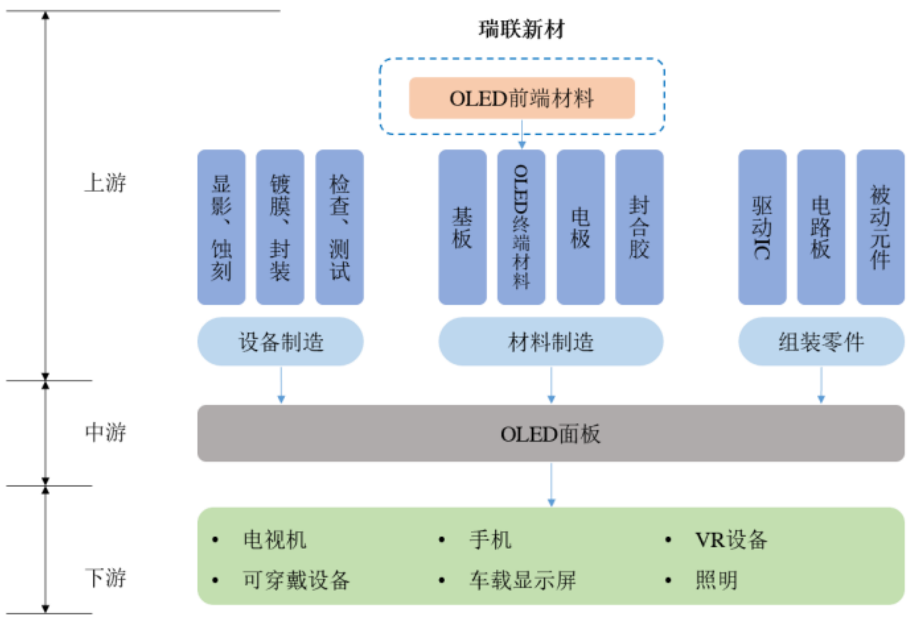
资料来源：Omdia，维信诺发行股份及支付现金购买资产并募集配套资金暨关联交易报告书（草案）（修订稿），HTI

2. OLED 终端材料技术壁垒高，逐步实现进口替代

2.1 OLED 材料产业链

OLED 材料产业链介绍。OLED 前端材料生产企业首先将基础化工原料合成中间体，再进一步加工合成为升华前材料，将其销售给终端材料生产企业，由终端材料生产企业进行物理升华处理后最终形成 OLED 终端材料，用于 OLED 面板的生产。OLED 行业上游主要包括：设备制程（显影、蚀刻、镀膜、封装等）、材料制造（OLED 终端材料、基板、电极等）和组装零件（驱动 IC、电路板和被动元件）；中游是 OLED 面板的组装；下游是 OLED 的终端应用，包括手机、电视等显示领域，同时也可应用于照明。

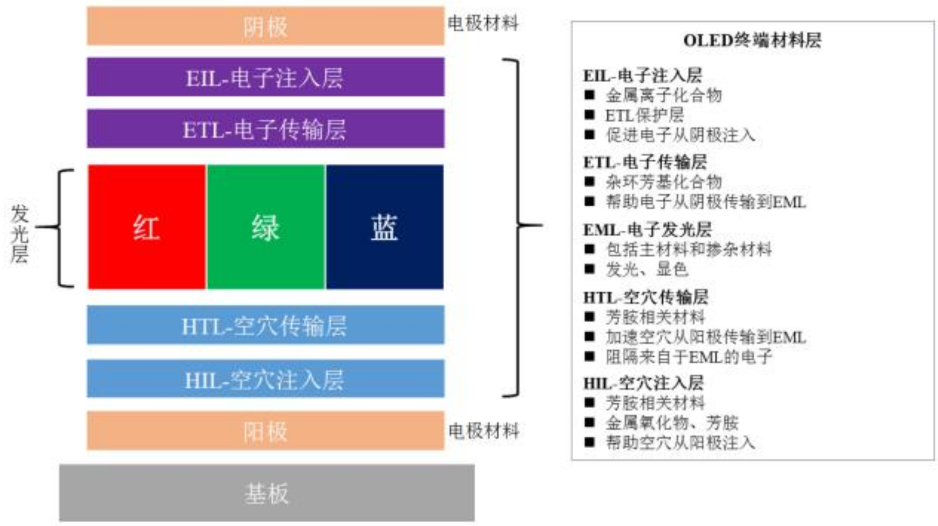
图7 OLED 产业链



资料来源：招股说明书，HTI

OLED 发光层材料可分为蓝光、红光和绿光材料。OLED 终端材料层主要分为发光层（EML）及通用层，其中通用层又包括电子注入层（EIL）、电子传输层（ETL）、空穴传输层（HTL）、空穴注入层（HIL）等。按照发光颜色的不同，发光层材料分为蓝光、红光和绿光材料，其中蓝光材料由于其衰减速度快的特性成为影响 OLED 显示效果、使用寿命的关键材料。

图8 OLED 结构图

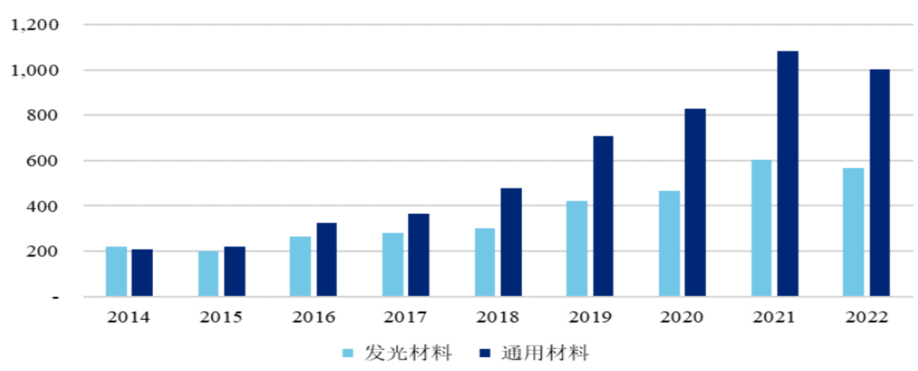


资料来源：招股说明书，HTI

2.2 OLED 材料市场持续增长

下游需求带动了 OLED 材料持续增长。根据不特定对象发行可转换公司债券募集说明书（上会稿）援引 Omdia 数据，2020 年全球 OLED 市场对显示材料的需求量为 88.47 吨，2021 年为 117.39 吨，同比增长 32.68%。2022 年，OLED 终端材料市场的需求增至 117.54 吨，较 2021 年增长 0.13%，其中发光材料和通用材料的需求量占比分别为 19.16% 和 80.84%。同时，OLED 终端材料品种也较多，且技术迭代更新速率较快，但随着 OLED 材料市场应用量的不断增长，其产品价格也一直处于下降趋势。2020 年 OLED 终端材料的市场规模约为 12.95 亿美元，2022 年增至约 15.67 亿美元，增幅约 20.96%。

图9 OLED 终端材料市场容量（百万美元）



资料来源：Omdia，不特定对象发行可转换公司债券募集说明书（上会稿），HTI

2.3 OLED 终端材料技术壁垒高，逐步实现进口替代

国外 OLED 终端材料起步早，具有先发优势。国外 OLED 有机材料的研究和产业化起步早、基础较好，UDC、杜邦公司、德国默克等大型外资企业在技术积累、资金实力和产业规模上具有一定优势；德山集团、LG 化学等韩国材料企业受到本土面板厂商三星、LGD 的扶植，较早的进入 OLED 供应链体系，在行业内占有先入优势。相比行业内大型外资企业，我国 OLED 产业起步较晚，因此在市场占有率、专利数量等方面处于竞争劣势。由于 OLED 终端材料的专利壁垒较高，核心专利主要掌握在国外厂商手中，导致我国在 OLED 终端材料的布局上较弱。

国内厂商突破专利壁垒，终端材料逐步实现国产化。近年来 OLED 有机材料厂商通过技术研发等途径逐步打破了国外的专利垄断，实现了 OLED 终端材料专利产品从 0 到 1 的突破。凭借优异的产品性能、成本、服务优势，国内 OLED 终端材料厂商逐步进入国内 OLED 面板厂商的供应链体系。

表 2 OLED 终端材料主要生产厂商

公司名称	公司简介	主要产品
UDC	UDC 是全球领先的 OLED 有机材料厂商，产品覆盖 OLED 终端材料中的 EML 以及多种功能层材料	OLED 终端材料
德国默克	德国默克广泛布局 OLED 业务，产品包括 OLED 终端材料中的 HTL、Green Host 等多个材料	OLED 终端材料
杜邦公司	杜邦公司产品覆盖了 OLED 终端材料中的 EML、HTL 等	OLED 终端材料
出光兴产	出光兴产的产品覆盖了 OLED 终端材料中的 HTL、HIL、ETL 及 EML 材料等	OLED 终端材料
LG 化学	LG 化学属于 LG 集团旗下子公司，主要向 LGD 供应 OLED 有机材料	OLED 终端材料
德山集团	德山集团是韩国主要的 OLED 有机材料厂商，产品覆盖了 OLED 终端材料中的 ETL、EML、HTL 等	OLED 终端材料
奥来德 （688378.SH）	奥来德主营业务为蒸发源设备与有机发光材料的研发、制造、销售及售后技术服务	蒸发源设备、OLED 终端材料等
莱特光电（688150.SH）	莱特光电主要从事 OLED 有机材料的研发、生产和销售	OLED 终端材料和 OLED 中间体等
万润股份（002643.SZ）	万润股份主要从事环保材料产业、电子信息材料产业、新能源材料产业和生命科学与医药产业领域产品的研发、生产和销售	OLED 成品材料、升华前单体材料和中间体材料

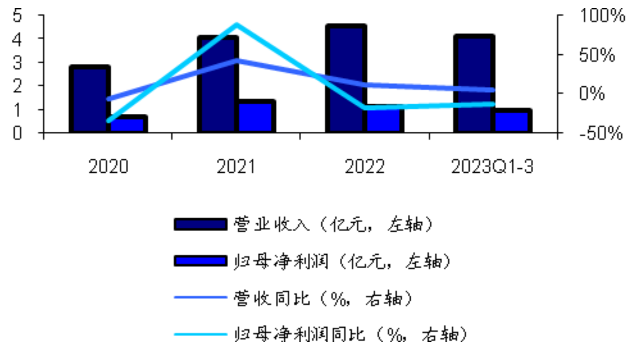
资料来源：莱特光电招股说明书，莱特光电 2023 年半年度报告，万润股份 2023 年半年度报告，HTI

3. 主要公司介绍

3.1 奥来德：主要产品包括 OLED 终端材料与蒸发源设备，持续拓展新产品

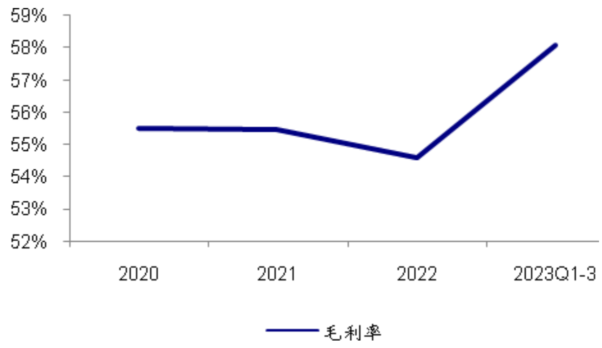
公司主要产品包括 OLED 终端材料与蒸发源设备，持续拓展新产品。有机发光材料方面，公司目前生产的发光功能材料涵盖红、绿、蓝材料，以发光主体材料为主。近年来，得益于公司深厚的技术积累，公司在封装材料、PDL 材料（显示用光刻胶）、蒸镀机等“卡脖子”产品上也有所突破，并延伸布局钙钛矿业务。2022 年有机发光材料收入为 2.13 亿元，同比增长 48.12%。公司 R’材料导入华星量产线和天马量产线，G’材料导入维信诺量产线，均已实现稳定量产供货。B’材料已经在华星新体系产线验证中。另外，开发的新一代 R’、G’、和 B’材料也同时在下游客户进行新器件体系测试。公司封装材料通过新客户审核，并实现供货；PDL 材料研发进展顺利，量产工艺稳定。

图10 2020-2023 前三季度奥来德营业收入及归母净利润变化



资料来源：WIND，HTI

图11 2020-2023 前三季度奥来德毛利率变化



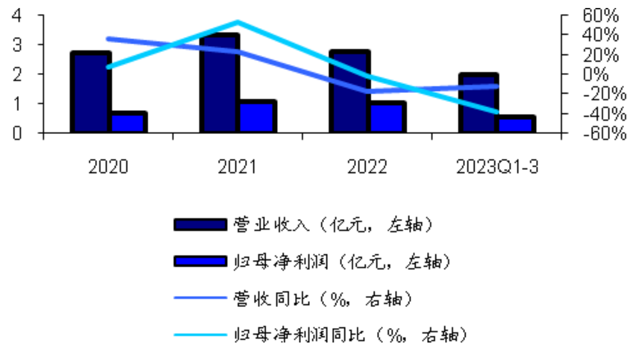
资料来源：WIND，HTI

风险提示。新产品开发进度低于预期；下游需求景气度低于预期。

3.2 莱特光电：主要产品包括 OLED 终端材料和 OLED 中间体

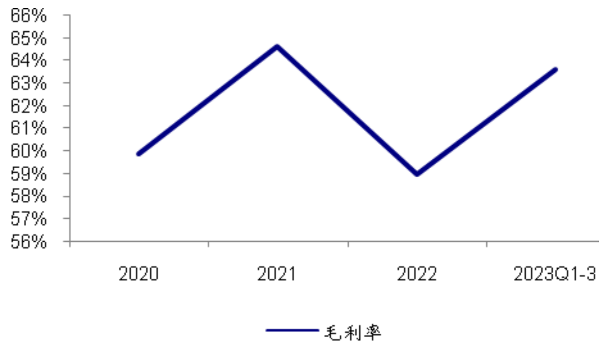
公司主要从事 OLED 有机材料的研发、生产和销售。公司在国内率先实现 OLED 终端材料从 0 到 1 的突破，是国内极少数具备自主专利并实现 OLED 终端材料量产供应的企业之一。公司拥有数百项 OLED 终端材料专利，自主研发生产的 Red Prime 材料获得国家工信部认定制造业“单项冠军”产品，Green Host 材料率先在客户端实现混合型材料的国产替代。截至 2023 年上半年，Red Prime 材料、Green Host 材料稳定量产供应，新产品 Red Host 材料、Green Prime 材料、Blue Prime 材料、Blue Host 材料在客户端积极推进国产替代。

图12 2020-2023 前三季度莱特光电营业收入及归母净利润



资料来源：WIND，HTI

图13 2020-2023 前三季度莱特光电毛利率变化



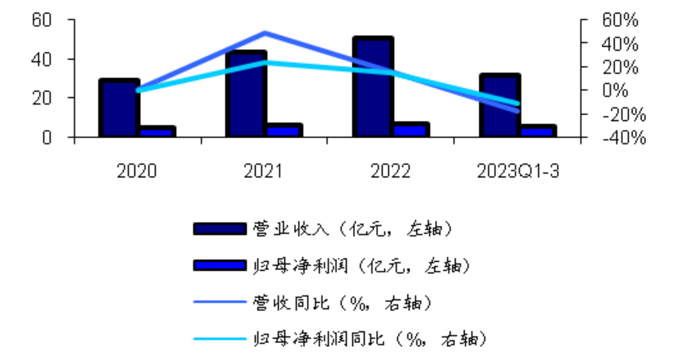
资料来源：WIND，HTI

风险提示。产品认证进度低于预期；产品价格下跌风险。

3.3 万润股份：公司 OLED 成品材料及升华前材料持续增长

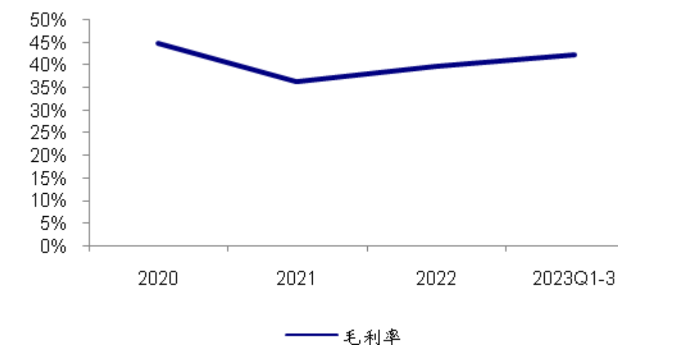
公司 OLED 材料业务持续推进。截至 2022 年公司控股子公司三月科技 OLED 成品材料通过下游客户验证并实现供应，三月科技收入规模呈增长态势；公司控股子公司九目化学的 OLED 升华前材料业务再创新高，继续保持业内领先供应地位。同时九目化学于 2021 年在烟台化工园区启动“OLED 显示材料及其他功能性材料一期项目”，该项目相关车间已投入使用。同时在聚酰亚胺材料方面，三月科技的 OLED 用光敏聚酰亚胺（PSPI）成品材料截至 2023 年上半年已在下游面板厂实现供应。

图14 2020-2023 前三季度万润股份营业收入及归母净利润



资料来源：WIND，HTI

图15 2020-2023 前三季度万润股份毛利率变化



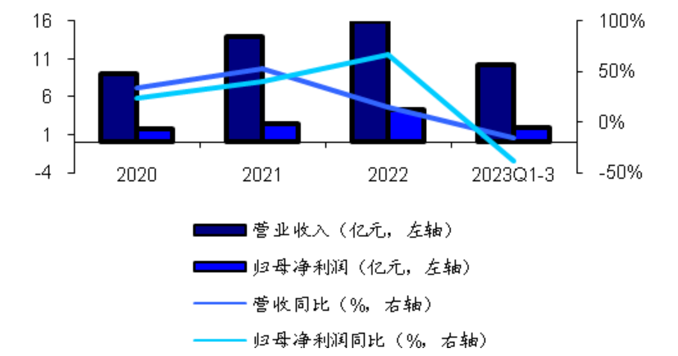
资料来源：WIND，HTI

风险提示。新项目进度低于预期；产品认证进度低于预期；原材料价格波动风险。

3.4 濮阳惠成：公司主要生产 OLED 相关的功能材料中间体

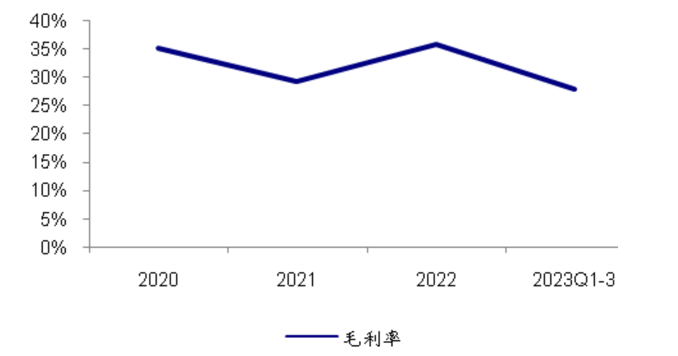
公司主要生产 OLED 相关的功能材料中间体。公司开发出 OLED 功能材料芴类衍生物并于 2011 年形成产业化生产。公司将通过不断改进 OLED 相关功能材料中间体的合成工艺，以降低生产成本，公司将继续重点开发计划内的 OLED 功能材料，主要包括：OLED 光电材料、OLED 空穴传输材料、空穴注入材料、空穴阻挡材料、电子传输材料、电子注入材料、电子阻挡材料中间体以及材料合成的催化剂配体有机膦类化合物等。

图16 2020-2023 前三季度濮阳惠成营业收入及归母净利润



资料来源：WIND，HTI

图17 2020-2023 前三季度濮阳惠成毛利率变化



资料来源：WIND，HTI

风险提示。新产品开发进度低于预期；原材料价格波动风险。

4. 投资建议

我们认为随着 OLED 终端应用领域的拓展推动市场规模持续增长，OLED 终端材料市场需求增加，国内 OLED 终端材料厂商逐步进入供应链体系，将逐步实现进口替代。建议关注 OLED 材料相关公司奥来德、莱特光电、万润股份、濮阳惠成等。

5. 风险提示

下游需求景气度低于预期；新建项目进度低于预期的风险；产品价格下跌风险。

APPENDIX 1

Summary

Investment Highlights:

OLED panel applications are expanding, driving market growth. With a CAGR of 6.8%, global AMOLED sales are expected to rise from $42 billion in 2021 to $54.7 billion by 2025. Domestic OLED market share is increasing, with Chinese companies expected to gain further ground. OLED material demand is up, with a 32.68% YoY increase in 2021, reaching 117.39 tons. High-tech barriers in OLED materials are being overcome, leading to domestic substitution for imports.

Investment advice: As OLED applications grow, so does material demand. Companies like Jilin Oled Material Tech, Shaanxi Lighte Optoelectronics Material Co.,Ltd, Valiant, and Puyang Huicheng Electronic Material are worth attention.

Risk Warning: Risks include lower-than-expected downstream demand, project delays, and price declines.

附录 APPENDIX

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分析师股票评级

优于大市，未来 12-18 个月内预期相对基准指数涨幅在 10%以上，基准定义如下

中性，未来 12-18 个月内预期相对基准指数变化不大，基准定义如下。根据 FINRA/NYSE 的评级分布规则，我们会将中性评级划入持有这一类别。

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

各地股票基准指数：日本 – TOPIX, 韩国 – KOSPI, 台湾 – TAIEX, 印度 – Nifty100, 美国 – SP500; 其他所有中国概念股 – MSCI China.

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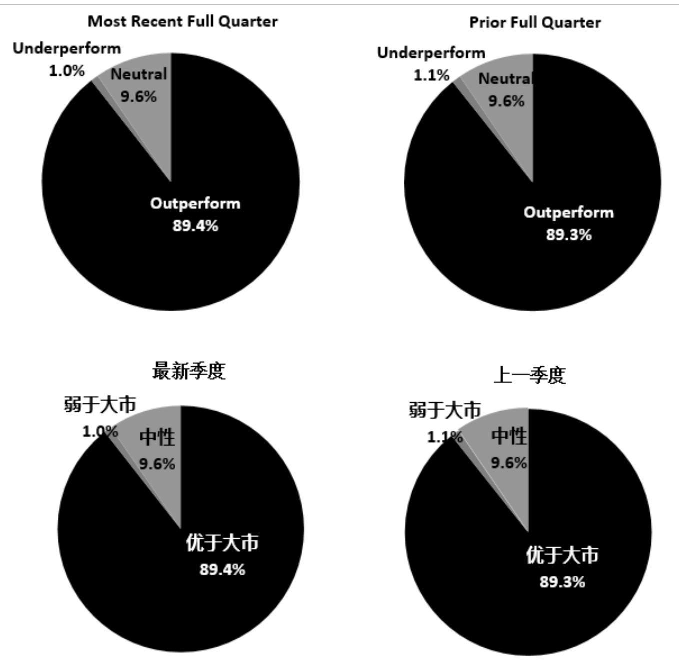
Analyst Stock Ratings

Outperform: The stock's total return over the next 12-18 months is expected to exceed the return of its relevant broad market benchmark, as indicated below.

Neutral: The stock's total return over the next 12-18 months is expected to be in line with the return of its relevant broad market benchmark, as indicated below. For purposes only of FINRA/NYSE ratings distribution rules, our Neutral rating falls into a hold rating category.

Underperform: The stock's total return over the next 12-18 months is expected to be below the return of its relevant broad market benchmark, as indicated below.

Benchmarks for each stock's listed region are as follows: Japan – TOPIX, Korea – KOSPI, Taiwan – TAIEX, India – Nifty100, US – SP500; for all other China-concept stocks – MSCI China.



截至 2023 年 12 月 31 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%	9.6%	1.0%
投资银行客户*	3.9%	5.1%	5.6%

*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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此前的评级系统定义（直至 2020 年 6 月 30 日）：

买入，未来 12-18 个月内预期相对基准指数涨幅在 10%以上，基准定义如下

中性，未来 12-18 个月内预期相对基准指数变化不大，基准定义如下。根据 FINRA/NYSE 的评级分布规则，我们会将中性评级划入持有这一类别。

卖出，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

各地股票基准指数：日本 – TOPIX, 韩国 – KOSPI, 台湾 – TAIEX, 印度 – Nifty100; 其他所有中国概念股 – MSCI China.

Haitong International Equity Research Ratings Distribution, as of December 31, 2023

	Outperform	Neutral (hold)	Underperform
HTI Equity Research Coverage	89.4%	9.6%	1.0%
IB clients*	3.9%	5.1%	5.6%

*Percentage of investment banking clients in each rating category.

BUY, Neutral, and SELL in the above distribution correspond to our current ratings of Outperform, Neutral, and Underperform.

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NEUTRAL: The stock's total return over the next 12-18 months is expected to be in line with the return of its relevant broad market benchmark, as indicated below. For purposes only of FINRA/NYSE ratings distribution rules, our Neutral rating falls into a hold rating category.

SELL: The stock's total return over the next 12-18 months is expected to be below the return of its relevant broad market benchmark, as indicated below.

Benchmarks for each stock's listed region are as follows: Japan – TOPIX, Korea – KOSPI, Taiwan – TAIEX, India – Nifty100; for all other China-concept stocks – MSCI China.

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