Power Equipment & New Energy & Utilities & ESG

电池材料更新：补库存与储能需求修复，排产显著提升，关注磷酸铁锂正极材料及电解液龙头企业的投资机会

Battery material updates: Inventory replenishment and energy storage demand recovery lead to increased production

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热点速评 Flash Analysis

(Please see APPENDIX 1 for English summary)

23Q1 锂电四大材料普遍处于清库存的状态，5 月以来电池厂库存大幅下降，基本已贴近安全的库存周期，而碳酸锂相关材料环节库存更低，目前整体库存水平：负极>电池>隔膜>电解液>正极。碳酸锂价格企稳反弹，储能需求修复，5 月电池四大材料厂商排产环比提高 15-30%，**我们相对看好大规模储能产业链上游材料中，磷酸铁锂正极与低投资强度、高回报的电解液环节，对隔膜及负极材料保持观望。**

磷酸铁锂正极占比持续提升，高镍正极材料成为三元锂主导，储能需求修复带动磷酸铁锂正极继续放量。在锂电四大材料中，正极材料企业数量最多，动力电池正极主要有三元锂和磷酸铁锂两种技术路线，正极也是产业链里成本最高的行业，约占电池总成本 20%，从高温稳定性上来说磷酸铁锂会有更大优势，合成工艺简单，原料易于开采，同时铁锂电池较三元而言成本低约 20%，**目前在 400-500km 以下的车型及大规模储能等应用中，磷酸铁锂具备较高的性价比，2023 年 Q1 中国动力电池装机量为 58.94GWh，同比增长了 28.8%。磷酸铁锂电池装机量为 38.29GWh，占比 65%，同比增长了 50%。**其中德方纳米、湖南裕能出货处于前列。但是，目前认为磷酸铁锂单体电池能量密度很难再继续突破，磷酸铁锂电池也证实在低温及严峻工况下，目前的新能源车续航能力将大打折扣，真实工况下综合平均里程仅为标称里程 NEDC 的约 70-80%。三元锂电池正在提高镍的比例并逐渐克服高温下稳定性差的劣势，一般来说三元电池镍钴锰的作用分别是：镍提供电池容量，钴提高导电性，锰提高稳定性，金属钴只能作为副产物开采，成本较高，**三元高镍无钴锂电池符合新能源汽车大动力高续航力低成本的需求。**目前三元锂正极材料中高镍 8 系、9 系已成为市场主导，其中容百科技、当升科技均有较高出货量。目前正极库存水平处于较低位，储能需求增速的修复及三元的低基数，磷酸铁锂和三元锂 5 月排产环比我们预计增加 20-30%。

负极材料产能过剩较明显，库存相对处于高位，硅基负极未来有望放量。自 2022 年以来，多家企业不断加码锂电负极投产，根据 SMM，**截至 2023 年 3 月公布的负极扩产项目产能已有 1900 多万吨，产能过剩较为明显，**负极材料快速的扩张主要是由于动力及储能等市场需求增长带动，也与前期负极上游石墨化产能紧缺、原料价格大幅上涨等因素造成的供应不稳定性及价格风险陡增有关。目前负极参与玩家较多，杉杉科技、中科电气、璞泰来等负极材料老玩家持续扩产，同时宁德时代、亿纬锂能等为首的动力电池企业也大举投资负极材料，巩固供应链稳定性，增强议价能力；也有君禾股份、石大胜华、索通发展等新玩家入局。考虑到负极材料在电芯体系的搭建中，需随正极材料与电解液进行适配调整，定制化明显。目前锂电池负极材料主要包括三种：一是碳系材料，包括天然石墨，人造石墨；二是硅基材料；三是非碳系材料，包括钛酸锂、金属锂等。2022 年负极出货占比来看，人造石墨占比达 87%，天然石墨负极占比约 10.5%，硅基负极占比约 2.5%。人造石墨凭借优良的循环性能、大倍率充放电效率和电解液相容性等显著优势，广泛应用于车用动力电池及中高端电子产品领域；天然石墨多用于小型锂电池和一般用途的电子产品锂电池中；**硅基负极的发展主要受到能量密度与快充需求的推动，主流为硅碳负极与硅氧负极，目前硅基负极多应用于消费品，未来有望大规模应用在 4680 动力电池。**

隔膜拥有重资产属性，行业进入壁垒和集中度高，龙头企业话语权强。锂电隔膜是关键的内层组件之一，隔膜的性能决定了电池的界面结构、内阻等，直接影响电池的容量、循环以及安全性能等特性。隔膜材质是不导电的，其物理化学性质对电池的性能有很大的影响。隔膜材料主要是以聚乙烯（polyethylene，PE）、聚丙烯（polypropylene，PP）为主的聚烯烃（Polyolefin）类隔膜，其中 PE 产品主要由湿法工艺制得，PP 产品主要由干法工艺制得。其中干法工艺可分为干法单向拉伸和干法双向拉伸。**由于下游动力、数码锂电池对能量密度要求高，而湿法隔膜厚度更薄，对提高锂电池能量密度有优势，因此中国锂电隔膜市场出货仍以湿法隔膜为主，2022 年市场占比高达 75%。**隔膜基材主要是聚丙烯（PP）、聚乙烯（PE）等聚烯烃，PE 是湿法隔膜的主要原料，PP 是干法隔膜的主要原料，目前原材料进口依赖度高。制造费用占比大主要系生产设备贵、造成设备折旧费用高。毛利率最高，这是因为**行业壁垒高、集中度高，龙头企业的盈利能力强。上下游深度绑定，**隔膜行业认证期大概 1-2 年，电池厂商选择和更换隔膜供应商会比较慎重，通过认证后不会轻易更换隔膜供应商，合作关系比较稳定，目前恩捷股份、星源材质、中材科技位居全国锂电隔膜出货前三。

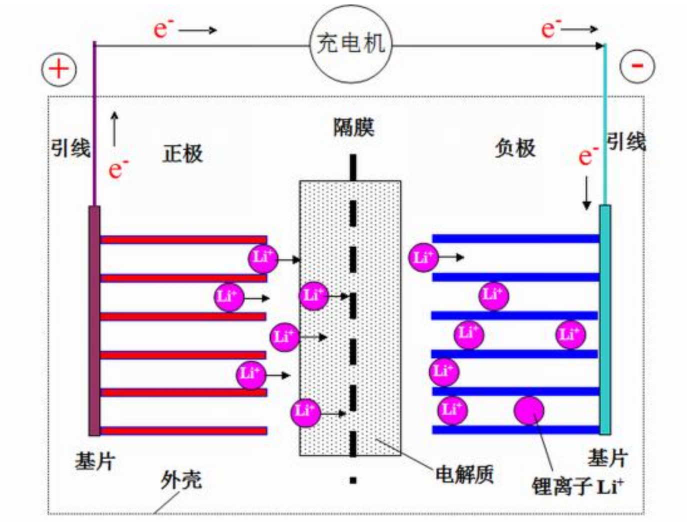
电解液行业正加速洗牌，原料自供率高、生产成本具备优势的龙头企业盈利状况较好。锂电池电解液是电池中离子传输的载体，一般由高纯度的有机溶剂、电解质锂盐、必要的添加剂等原料，在一定条件下、按一定比例配制而成。理想的电解液需要具备高电导率、高热稳定性、高化学稳定性、高电级兼容性、和低成本等特性。电解液要起到良好运输离子作用，需要具备较高的电导率，还需要具有较高的热稳定性和化学稳定性，不会轻易发生热分解，在较宽电压范围内能保持较为稳定的温度，在长循环时自身不发生化学反应，此外，电解液需要与电机拥有很高的兼容性，能在负极上形成稳定的 SEI 膜。**电解液行业具备投资强度低、周转率高、龙头净利率较高的特点，ROE 具备优势。**电解液产能规划过剩，有望加速产能出清，自 2021 年起龙头企业开始进入加速扩产阶段，同时新加入者开始大规模规划电解液产能，我们预计 2022 年国内电解液产能超过 220 万吨，**竞争加剧有望加速落后产能出清，原料自供率高、生产成本具备优势的龙头企业的市场份额有望得到提升。未来电解液行业集中度进一步提高，原料成本竞争的重要性凸显，**其中天赐材料实现液态六氟磷酸锂的大规模自产，在添加剂通过浙江天硕进行布局；新宙邦实现溶剂和添加剂的自供；瑞泰新材通过超威新材布局各类型添加剂等。

总结：23Q1 锂电四大材料普遍处于清库存的状态，5 月以来电池厂库存已出现大幅下降，基本已贴近安全的库存周期，而碳酸锂相关材料环节库存更低，目前整体库存水平：负极>电池>隔膜>电解液>正极。正极材料中，磷酸铁锂正极占比持续提升，高镍正极材料成为三元锂主导；负极材料产能过剩较明显，新型负极的硅基负极未来有望进一步应用；隔膜有重资产属性，行业壁垒和集中度高；电解液投资强度低，龙头企业净利率较高，目前产能过剩，行业正加速洗牌进程。

投资建议：建议关注目前业绩增长确定性高的锂电材料板块，关注磷酸铁锂正极与电解液材料龙头企业德方纳米、湖南裕能、天赐材料、多氟多、新宙邦等的投资机会。

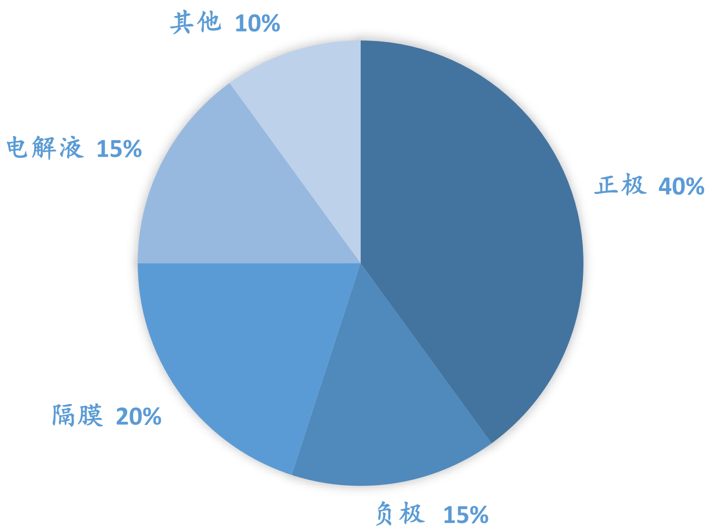
风险：新能源车销量不及预期，储能需求增长不及预期，电池材料价格战的影响加剧。

图表 1：充电时锂电池工作原理



资料来源：SNE Research，HTI

图表 2：锂电池成本构成



资料来源：GGII， HTI

APPENDIX 1

In 23Q1, the four major materials of lithium batteries are generally in the state of clearing inventory. Since May, the inventory of battery factories has dropped sharply, which is basically close to the safe inventory cycle, while the inventory of lithium carbonate-related materials is even lower. The current overall inventory level: Anode > battery > Separator > Electrolyte > Cathode. Among the positive electrode materials, the proportion of lithium LFP cathode continues to increase, and the high-nickel cathode material has become the dominant NCM materials. The overcapacity of anode materials is obvious, and the silicon-based materials of the new anode is expected to be further applied in the future. The separator has heavy asset attributes, industry barriers and the concentration are high. The investment intensity of electrolyte is low, the net profit rate of leading enterprises is relatively high, the current overcapacity, and the industry is accelerating the process of reshuffle.

Suggestions: Attention on the current lithium battery material sector with high performance growth certainty, focusing on Dynanonic, Hunan Yuneng, Tianci Materials, Do-Fluoride, and Capchem.

Risks: The sales of new energy vehicles are lower than expected. The growth of energy storage demand is lower than expected. The impact of the price war on battery materials is intensified.

附录 APPENDIX

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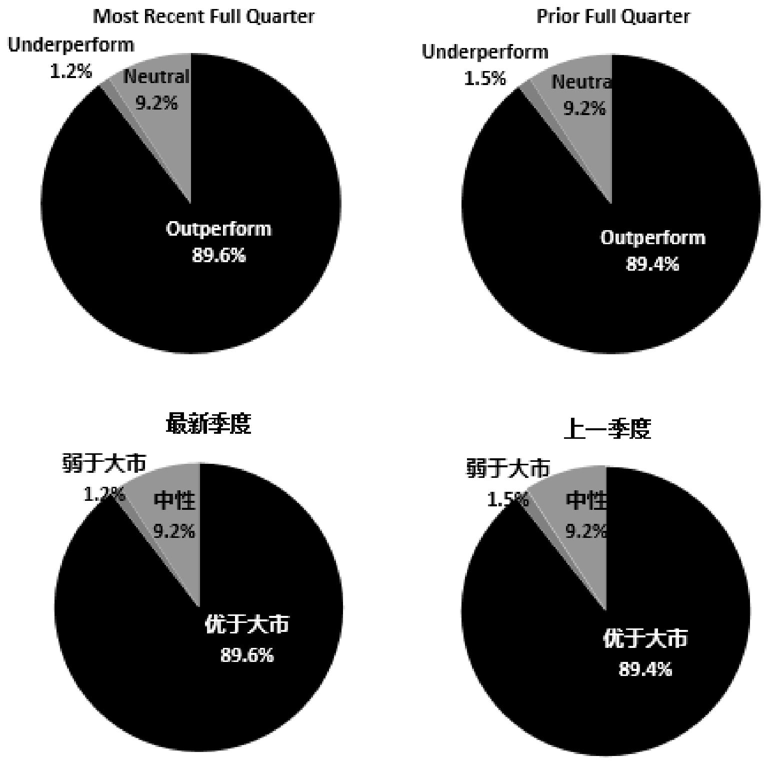
评级分布 Rating Distribution



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	优于大市	中性 (持有)	弱于大市
海通国际股票研究覆盖率	89.6%	9.2%	1.2%
投资银行客户*	5.2%	6.4%	9.5%

*在每个评级类别里投资银行客户所占的百分比。

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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.

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