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A leader in advanced ceramics

Three-Circle Group takes lead in the production and sales of ceramic-based optical communications components, alumina ceramic substrates and ceramic matrices used in resistors.

Ceramic chassis. Three-Circle Group is well placed to benefit from the would-be introduction of ceramic housing by China's incumbent "big three" smartphone makers, Huawei, Oppo and Vivo, as different from its domestic peers, Three-Circle Group is self-sufficient in ceramic powder, able to produce 1mn pieces of ceramic chassis per month.

Multilayer ceramic capacitors (MLCC). A dearth of MLCC supply estimated to last for at least a year and a half compounded by a surge in the prices of palladium, a key ingredient of MLCC, together with increasing demand emanating from such burgeoning areas as EV and auto electronics and the growing use of passive components for smartphones, would spur and sustain a MLCC price upturn, in our view, providing tailwinds for Three-Circle Group, whose MLCC division earned around RMB100mn in 2016, accounting for 4% of its full-year revenue.

Ceramic-based optical communications components. With gross margin exceeding 50%, the company's fiber optic ceramic ferrules and sleeves business claimed a market share of more than 80% by year-end 2017, up from the previous 50%, thanks mainly to a practice of price-cutting since the beginning of 2016 on the back of its self-sufficiency in ceramic powder and economies of scale. Looking ahead, as 5G deployment is imminent which will dial up demand for optical communications components, the company may as well make a U-turn in its pricing strategy, in our view.

Electroceraic packaging. Three-Circle Group's semiconductor devices unit (including electroceramic packaging) recorded a 2016 operating revenue of RMB600mn, a far cry compared to about RMB14.1bn for that of Kyocera. Hence, there is plenty of scope for Three-Circle Group to keep up with its arch rival.

Earnings forecast. We predict Three-Circle Group to have net profit attributable to the parent of RMB1.078bn/1.551bn/2.111bn for 2017-2019, corresponding to EPS of RMB0.62/0.90/1.22 and 35x/24x/18x PER. Our six-month target price of RMB29.60 is based on a 33x PER for 2018. Upgrade to Buy.

Three-Circle Group (300408)

Rating

Buy

Issuing analyst:

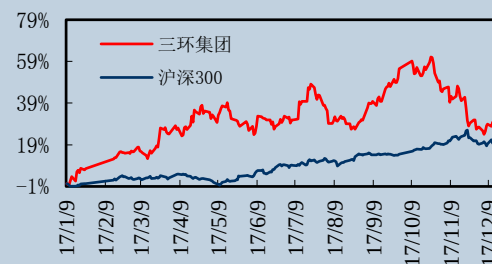
Steven Liu, CFA, PhD (CE No.: AMO971)

Stevenliu@csci.hk

+852 3465 5652

Date: 7 February 2018

Share price performance



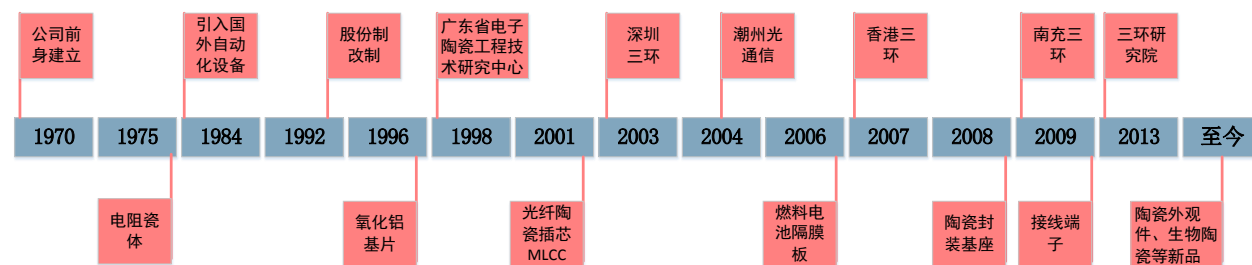
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An electroceramics heavyweight with superior earnings performance

Chaozhou Three-Circle Group Co., Ltd. ("Three-Circle Group"), a bellwether in the ceramic industry, is now focused on electroceramics with products spanning fiber optic ceramic ferrules and sleeves, fuel cell membranes, electroceramic packaging, ceramic matrices, ceramic substrates, connectors, MLCCs and resistors. The company was founded in 1970 and listed in 2014.

Figure 1: Company history



Source: Three-Circle Group's website, Research Dept, CSCI

Three-Circle Group boasts to be the world's biggest producer and seller of ceramic-based optical communications components, alumina ceramic substrates and ceramic matrices used in resistors and the only manufacturer in China capable of mass production of electroceramic packaging, taking the largest domestic market share in compressor connectors as well.

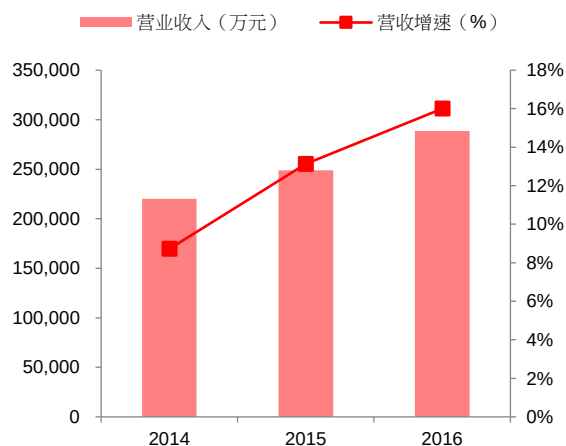
Table 1: Three-Circle Group's product categories and key accounts

产品种类	技术水平及特点	重要客户
光纤陶瓷插芯及套筒	产品技术居国际先进水平，同轴度和尺寸精度高，插入损耗低，强度高、耐磨损、插拔次数高、抗老化性能好，使用寿命长等特点	产品已获欧美等知名企业的认可，美国泰科、美国安费诺、瑞士HUBER、法国RADIAL等世界知名光纤连接器生产企业，均是公司光纤陶瓷插芯的用户
燃料电池隔膜板	产品技术水平居国际领先，产品机械强度高、离子电导率高，抗老化性能好，使用寿命长，产品平整度好、尺寸及厚度精度高，产品品质客户认可度高。	全球著名固体氧化物燃料电池系统研发和生产企业美国布卢姆能源公司的核心原材料燃料电池隔膜板的主要提供商之一
陶瓷封装基座	产品技术水平居国内领先，产品机械强度高，金属层耐磨及耐环境性好，解决了气密性、平整度、尺寸精度及一致性、表面清洁度控制等关键性能问题。	打破了多年来由少数几家掌握规模化制造技术的外国公司垄断陶瓷封装基座市场的局面，已形成陶瓷封装基座批量化规模生产，直接参与全球竞争
陶瓷基片	产品技术居国际先进水平，具有机械强度及电绝缘强度高，尺寸精度、压痕控制及产品翘曲度、平行度、直角度、表面粗糙度控制好等特点。	美国 VISHAY、英国 TT、日本松下部品、韩国三星电机、台湾国巨、台湾华新科技、国内的风华高科等知名厂家，均是公司的客户。
陶瓷基体	产品技术居国际先进水平，具有机械强度高，电绝缘性好，尺寸精度及外观缺陷控制好等特点。	公司是我国乃至全球陶瓷基体的主要供应商，产品供应对引线电阻市场有着重大影响，具有难以替代的行业地位
接线端子	产品技术居国际先进水平，具有高压气密性好，绝缘强度及机械强度高，耐热冲击性好，耐候性好等特点，产品可靠性高。	产品已批量供货给国内外的大批知名客户，并成为空调用压缩机行业知名生产企业美芝、凌达、海立的第一供应商。
MLCC	产品技术居国内先进水平，产品机械强度高，耐热冲击、温度特性及电性能优良，可靠性高，产品精度高，一致性好。	公司已是的、康佳、格力、TCL、创维等业界知名企业的供应商，是我国 MLCC 的主要生产企业之一。
电阻	产品技术居国内先进水平，产品阻值精度高，耐压高，阻值随温度变化小，耐久性、耐高压脉冲、耐湿负荷等可靠性好。	

Source: Wind, Research Dept, CSCI

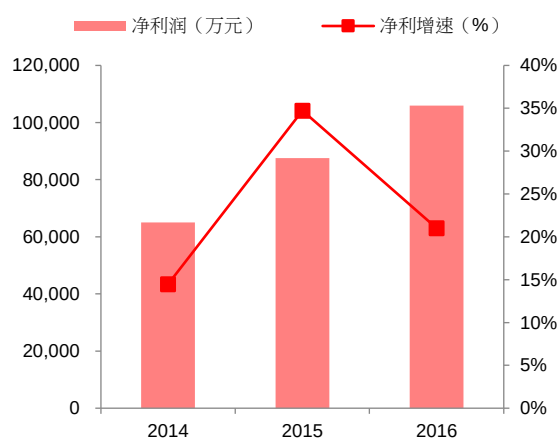
The company racked up operating revenues of RMB2.2bn/2.49bn/2.89bn in 2014/2015/2016, up 8.7%/13.13%/16.00% YoY, translating into net profits of RMB650mn/880mn/1.06bn, up 14%/35%/21% YoY.

Figure 2: Three-Circle Group's operating revenue and the growth rate thereof 2014-2016



Source: Three-Circle Group's announcements, Research Dept, CSCI

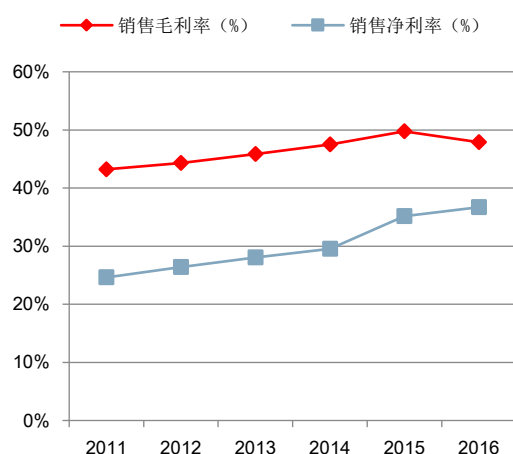
Figure 3: Three-Circle Group's net profit and the growth rate thereof 2014-2016



Source: Three-Circle Group's announcements, Research Dept, CSCI

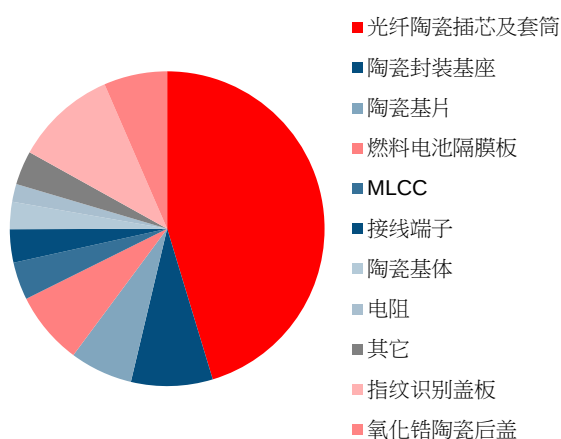
In terms of 2016 net profit, Three-Circle Group was the champion among 30 A-share electronic component makers, ranked No.3 among these companies with respect to gross margin during the 2013-2016 period.

Figure 4: Three-Circle Group's gross/net profit margin 2011-2016



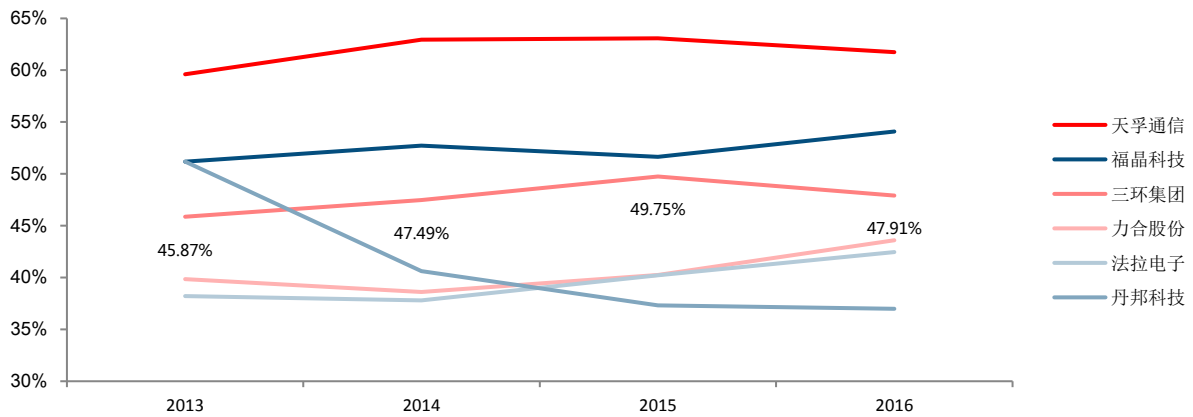
Source: Wind, Research Dept, CSCI

Figure 5: Three-Circle Group's 2016 revenue composition



Source: Wind, Research Dept, CSCI

Figure 6: Peer comparison in terms of gross margin 2013-2016



Source: Wind, Research Dept, CSCI

Optical communications components, semiconductor devices, electronic component materials and fuel cell membranes constituted the mainstay of Three-Circle Group's 2016 revenue.

Ceramic chassis/MLCC

Ceramic chassis

Metal as a conductor will absorb or reflect radio waves and thus causes wireless interference. As a result, ceramic and glass chassis, which are free of such an off-putting nature while bestowed with properties such as high rigidity and excellent surface polish, are gaining in popularity among smartphone makers as the world ushers in the new era of wireless charging and 5G.

Table 2: Major smartphone models adopting a ceramic back cover

所属品牌	手机型号	上市时间	售价 (元)
小米	小米5尊享版	2016/03	2699
	小米MIX	2016/11	3499
	小米6	2017/10	2299起
	小米MIX2	2017/09	3299起
华为	Ascend P7	2014/09	4688
	蓝宝石典藏版		
	Ascend P7 陶瓷纪念版	2015/03	2588
	Ascend P8	2015/04	2888
酷派	lvviS6	2014/12	2799
金立	天鉴W808	2014/01	5999
一加	一加手机X陶瓷版	2015/10	2499
初上科技	CHUS H1	2017/06	7999
Essential	Essential Phone 1	2017/08	4700
Apple	Apple Watch Series2 精密陶瓷款	2016/09	1249美元起

Source: zol.com.cn, Research Dept, CSCI

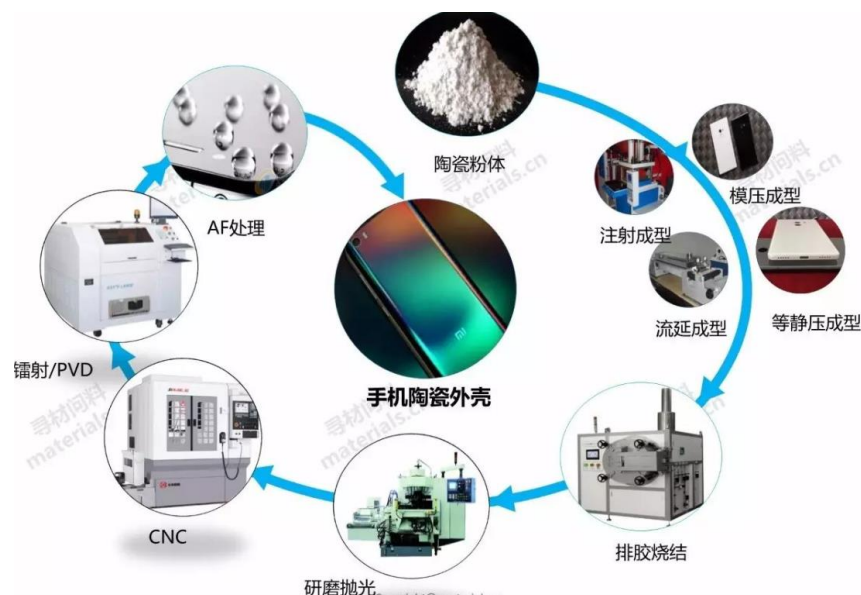
Global shipments of smartphones came to 1.517bn units in 2017 and look set to reach 1.744bn by 2021, according to IDC's forecast. This could hint at a ceramic chassis market size of RMB31.4bn by 2021 on an assumed penetration rate of 30% and a unit price of RMB60.

Table 3: Ceramic chassis market size forecast

	2017E	2021E
全球智能手机出货量（亿支）	15.17	17.44
陶瓷后盖方案渗透率（%）	0.3%	30%
手机陶瓷后盖单价（元/片）	250	60
手机陶瓷后盖市场规模（亿元）	11	314

Source: IDC, Research Dept, CSCI

Figure 7: How ceramic chassis are produced



Source: xincailiao.com, Research Dept, CSCI

China as it stands still relies heavily on the import of ceramic powder. But Three-Circle Group is an exception. The company possesses proprietary technologies throughout the zirconia powder production process with effective cost and yield control, able to produce 1mn pieces of high performance ceramic chassis per month, and is thus best placed to benefit from the would-be introduction of ceramic housing by China's incumbent "big three" smartphone makers, Huawei, Oppo and Vivo.

MLCC

A dearth of MLCC supply not least from Japanese manufacturers like Murata, the biggest MLCC producer in the world, is estimated to last for at least a year and a half. This, compounded by a surge in the prices of palladium, a key ingredient of MLCC, together with increasing demands emanating from such burgeoning areas as EV and auto electronics and the growing use of passive components for smartphones, would spur and sustain a MLCC price upturn, in our view, providing tailwinds for Three-Circle Group, whose MLCC division earned around RMB100mn in 2016, accounting for 4% of its full-year revenue.

Figure 8: Three-Circle Group's MLCC offerings



Source: Three-Circle Group's website, Research Dept, CSCI

Ceramic-based optical communications components/electroceramic packaging

Ceramic-based optical communications components

We are living in a world where 5G commercialization is approaching fast, FTTH implementations are gathering pace, and the DC construction boom is in full charge. These all fire up demand for fiber optic ceramic ferrules, an indispensable part of fiber optic connectors.

China's fiber optic ceramic ferrules market is the largest in the world, with an output of 2.25bn in 2015 and set to grow at a CAGR of 15% to reach 3.434bn by 2018.

Table 4: Optical communications component categories

产品类别	功能	主要产品	重要性
光有源器件	光信号的产生、放大和接收，完成信号的光-电、电-光转换和放大等功能。	光纤放大器、光纤激光器、光检测器、光转发器、光模块和光调制器等	光发射机、光接收机和光中继器的关键器件，和光纤一起决定着光纤传输系统的水平。
光无源器件	用于控制光信号流动方向、通与断和光信号的整形。	光纤连接器、光纤耦合器、波分复用器、光开关、光衰减器、光隔离器、光滤波器和光分路器等	重要组成部分

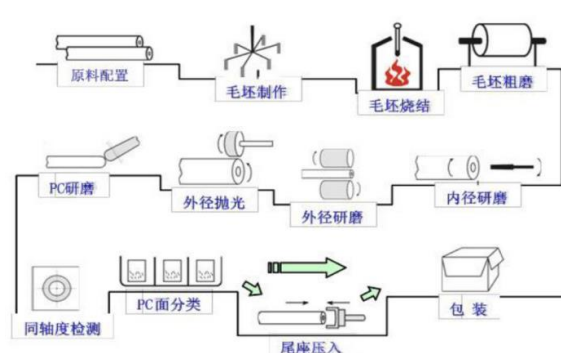
Source: chyxx.com, Research Dept, CSCI

Figure 9: Fiber optic ceramic ferrules



Source: Three-Circle Group's website, Research Dept, CSCI

Figure 10: How fiber optic ceramic ferrules are produced



Source: Three-Circle Group's prospectus, Research Dept, CSCI

Three-Circle Group, already a recognized global leader in fiber optic ceramic ferrules, boasts a client roster of famous international fiber optic connector vendors such as TE Connectivity, Amphenol Industrial, HUBER+SUHNER and Radiall.

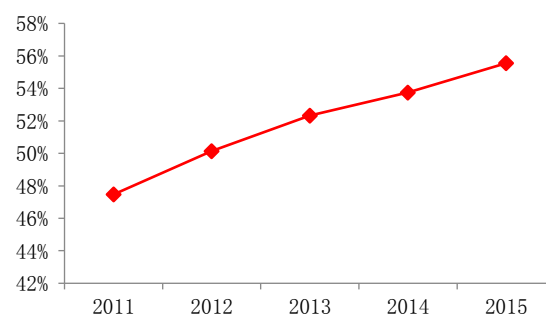
With an eye-catching gross margin of above 50%, the company's fiber optic ceramic ferrules and sleeves business claimed a market share of more than 80% by year-end 2017, up from the previous 50%, thanks mainly to a practice of price-cutting since the beginning of 2016 on the back of its self-sufficiency in ceramic powder and economies of scale. Looking ahead, as 5G deployment is imminent which will dial up demand for optical communications components, the company may as well make a U-turn in its pricing strategy, in our view.

Figure 11: Three-Circle Group is competitive in ceramic-based optical communications components



Source: Three-Circle Group's website, Research Dept, CSCI

Figure 12: Gross margin for Three-Circle Group's fiber optic ceramic ferrules and sleeves arm 2011-2015



Source: Wind, Research Dept, CSCI

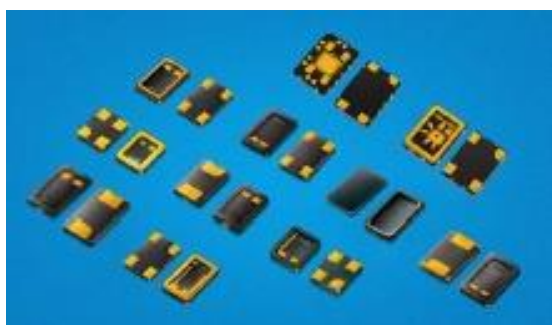
Electroceramic packaging

Three-Circle Group is the only manufacturer in China capable of volume production of ceramic packaging for surface-mount devices (SMDs), a core component of communications and digital products, counting Partron, NDK and Micro Crystal as its customers.

There are only four companies in the world able to mass produce electroceramic packaging, namely, Kyocera, NSEED, NTK and Three-Circle Group, with Kyocera having the largest market share and the broadest offering of product categories.

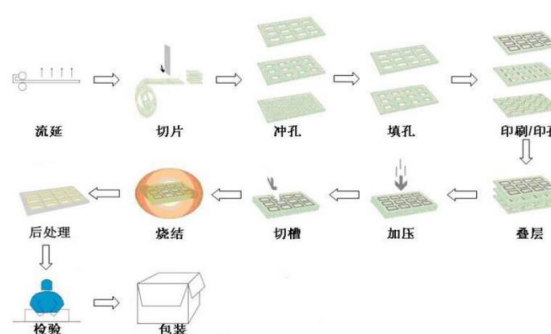
Three-Circle Group's semiconductor devices unit (including electroceramic packaging) recorded a 2016 operating revenue of RMB600mn, a far cry compared to about RMB14.1bn for that of Kyocera. Hence, there is plenty of scope for Three-Circle Group to keep up with its arch rival.

Figure 13: Ceramic packaging for SMDs



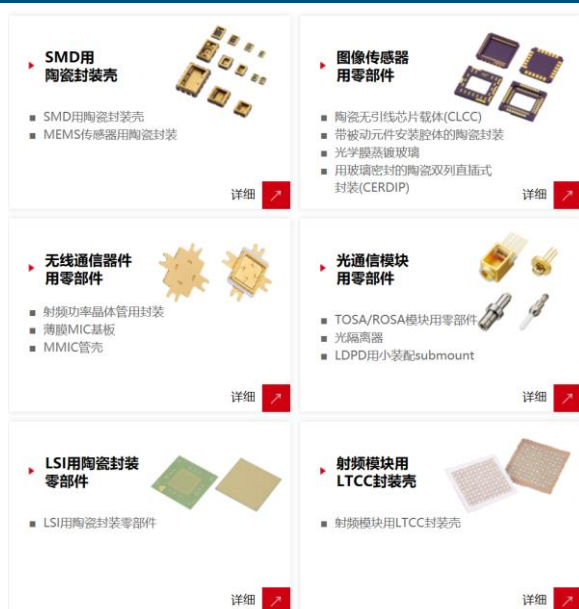
Source: Three-Circle Group's website, Research Dept, CSCI

Figure 14: How electroceramic packaging is produced



Source: Three-Circle Group's prospectus, Research Dept, CSCI

Figure 15: Kyocera semiconductor devices



Source: Three-Circle Group's website, Research Dept, CSCI

Figure 16: Kyocera semiconductor devices



Source: Three-Circle Group's website, Research Dept, CSCI

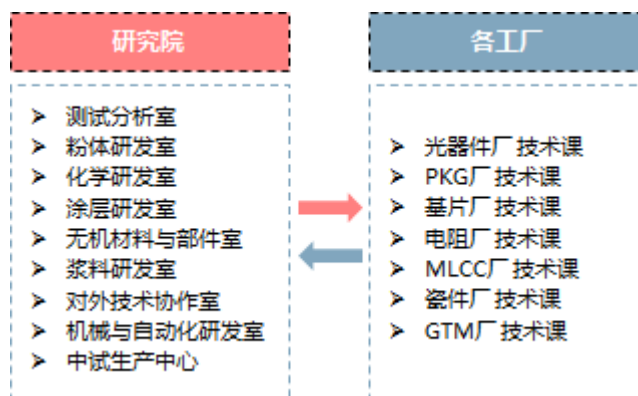
R&D-driven innovator

The global advanced ceramics market reached a size of USD61bn in 2016, significantly up from USD34bn in 2006, and is expected to further expand to USD68bn by 2018, according to Roland Berger.

With such an upbeat picture in mind, Three-Circle Group is proactively opening up new avenues of growth in areas such as 5G, biomedicine and environmental protection to achieve sustainable development.

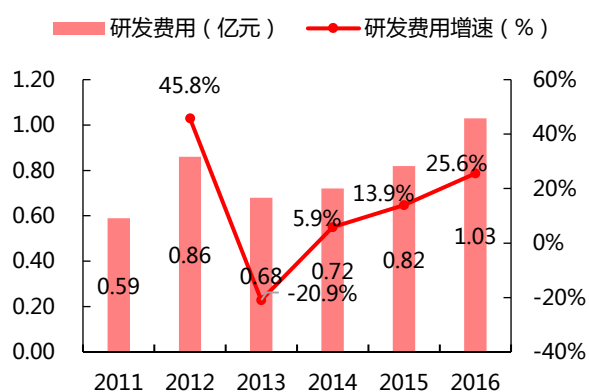
Like its leading global peers, Three-Circle Group invests more than 3% of its annual operating revenue into R&D, bringing out new products every two or three years to bolster earnings growth. The company has established a research institute alongside a more than 600-strong R&D team, covering a wide-ranging variety of cutting-edge technologies and futuristic subjects.

Figure 17: Three-Circle Group's R&D deployment



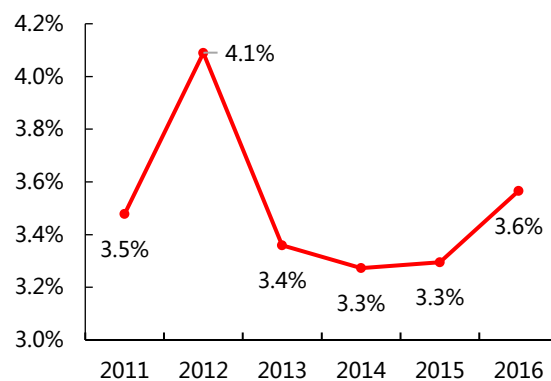
Source: Three-Circle Group's website, Research Dept, CSCI

Figure 18: Three-Circle Group's R&D spending and the growth rate thereof 2011-2016



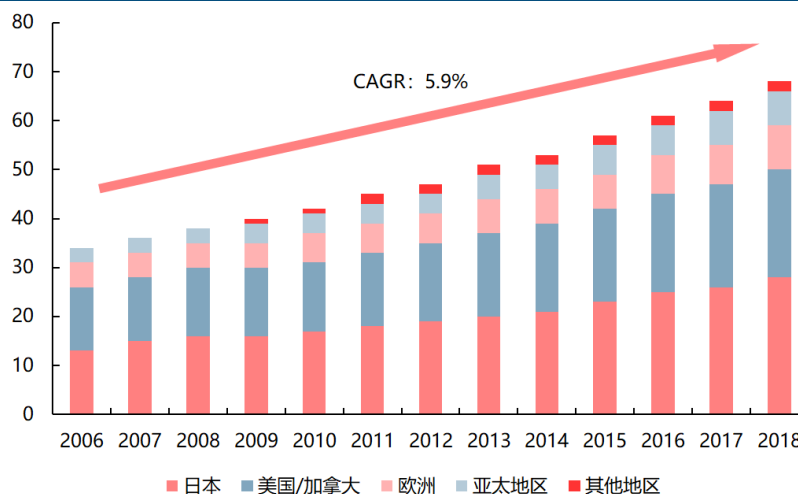
Source: Three-Circle Group's announcements, Research Dept, CSCI

Figure 19: Three-Circle Group's R&D spending as a percentage of its operating revenue 2011-2016



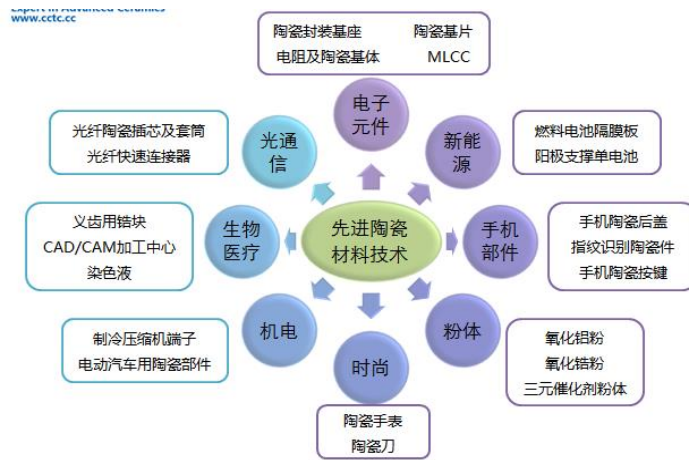
Source: Wind, Research Dept, CSCI

Figure 20: Global advanced ceramics market size by region 2006-2018



Source: Roland Berger, Research Dept, CSCI

Figure 21: Three-Circle Group's major offerings and their downstream application



Source: Three-Circle Group, Research Dept, CSCI

Earnings forecast

We predict Three-Circle Group to have net profit attributable to the parent of RMB1.078bn/1.551bn/2.111bn for 2017-2019, corresponding to EPS of RMB0.62/0.90/1.22 and 35x/24x/18x PER. Our six-month target price of RMB29.60 is based on a 33x PER for 2018. Upgrade to Buy.

Table 5: Earnings forecast by division

		2016	2017E	2018E	2019E
光纤陶瓷插芯及套筒	收入 (亿元)	13.92	10.78	13.44	15.86
	增速 (%)	-6%	-23%	25%	18%
	毛利率 (%)	53%	52%	52%	51%
陶瓷封装基座	收入 (亿元)	2.57	4.76	6.19	6.50
	增速 (%)	30%	85%	30%	5%
	毛利率 (%)	44%	44%	44%	44%
陶瓷基片	收入 (亿元)	1.98	2.38	2.86	3.43
	增速 (%)	5%	20%	20%	20%
	毛利率 (%)	45%	45%	45%	45%
燃料电池隔膜板	收入 (亿元)	2.30	2.30	2.76	3.31
	增速 (%)	40%	0%	20%	20%
	毛利率 (%)	44%	44%	44%	44%
MLCC	收入 (亿元)	1.19	1.49	1.64	1.77
	增速 (%)	0%	25%	10%	8%
	毛利率 (%)	31%	31%	31%	31%
接线端子	收入 (亿元)	1.05	1.26	1.26	1.26
	增速 (%)	0%	20%	0%	0%
	毛利率 (%)	40%	40%	40%	40%
陶瓷基体	收入 (亿元)	0.86	0.86	0.86	0.86
	增速 (%)	0%	0%	0%	0%
	毛利率 (%)	35%	35%	35%	35%
电阻	收入 (亿元)	0.56	0.56	0.56	0.56
	增速 (%)	20%	0%	0%	0%
	毛利率 (%)	38%	38%	38%	38%
其它	收入 (亿元)	1.07	1.28	2.05	3.29
	增速 (%)	0%	20%	60%	60%
	毛利率 (%)	49%	49%	49%	49%
指纹识别盖板	收入 (亿元)	3.20	3.33	2.85	2.57
	增速 (%)		4%	-14%	-10%
	毛利率 (%)	50%	48%	46%	45%
手机陶瓷后盖	收入 (亿元)	2.00	5.69	15.30	27.00
	增速 (%)		185%	169%	76%
	毛利率 (%)	50%	50%	51%	52%
合计	收入 (亿元)	30.71	34.70	49.77	66.41
	增速 (%)	24%	13%	43%	33%
	毛利率 (%)	48.00%	47.16%	47.82%	48.64%

Source: Research Dept, CSCI

Risk factors

Demand from the optical communications sector and deployment in the smartphone area may fall short of expectations.

Financial forecast

财务报表预测

利润表 (百万元)

	2016A	2017E	2018E	2019E
营业收入	2888	3470	4977	6641
营业成本	1504	1834	2597	3410
毛利	1383	1636	2380	3230
% 营业收入	47.9%	47.2%	47.8%	48.6%
营业税金及附加	33	39	56	75
% 营业收入	1.1%	1.1%	1.1%	1.1%
销售费用	48	56	80	106
% 营业收入	1.7%	1.6%	1.6%	1.6%
管理费用	247	330	448	558
% 营业收入	8.6%	9.5%	9.0%	8.4%
财务费用	-6	6	41	83
% 营业收入	-0.2%	0.2%	0.8%	1.2%
资产减值损失	-3	0	0	0
公允价值变动收益	0	0	0	0
投资收益	106	0	0	0
营业利润	1170	1206	1756	2408
% 营业收入	40.5%	34.7%	35.3%	36.3%
营业外收支	64	50	50	50
利润总额	1234	1256	1806	2458
% 营业收入	42.7%	36.2%	36.3%	37.0%
所得税费用	174	177	254	346
净利润	1060	1079	1552	2112
归属于母公司所有者的净利润	1059.2	1078.1	1550.6	2110.9
少数股东损益	1	1	1	1
EPS (元/股)	0.61	0.62	0.90	1.22

现金流量表 (百万元)

	2016A	2017E	2018E	2019E
经营活动现金流净额	948	404	-92	579
取得投资收益收回现金	98	0	0	0
长期股权投资	0	0	0	0
无形资产投资	0	-40	-50	-60
固定资产投资	-436	-337	-415	-353
其他	-35	0	0	0
投资活动现金流净额	-472	-377	-465	-413
债券融资	0	0	0	0
股权融资	6	0	0	0
银行贷款增加 (减少)	14	335	1217	698
筹资成本	302	-271	-421	-601
其他	-609	0	0	0
筹资活动现金流净额	-286	64	796	97
现金净流量	190	92	238	263

资产负债表 (百万元)

	2016A	2017E	2018E	2019E
货币资金	457	548	786	1049
交易性金融资产	3	3	3	3
应收账款	910	1005	1441	1923
存货	407	482	675	877
预付账款	24	30	43	57
其他流动资产	2103	2742	3756	4727
流动资产合计	4559	5596	7834	10142
可供出售金融资产	1	1	1	1
持有至到期投资	0	0	0	0
长期股权投资	0	0	0	0
投资性房地产	0	0	0	0
固定资产合计	1020	1234	1505	1681
无形资产	231	259	295	338
商誉	0	0	0	0
递延所得税资产	32	0	0	0
其他非流动资产	41	41	41	41
资产总计	5883	7131	9674	12203
短期贷款	14	349	1566	2264
应付款项	204	261	383	521
预收账款	6	7	10	13
应付职工薪酬	85	103	146	192
应交税费	59	61	88	119
其他流动负债	81	100	61	80
流动负债合计	448	881	2254	3189
长期借款	0	0	0	0
应付债券	0	0	0	0
递延所得税负债	0	0	0	0
其他非流动负债	291	291	291	291
负债合计	740	1173	2546	3480
归属于母公司所有者权益	5114	5928	7098	8690
少数股东权益	30	30	31	32
股东权益	5144	5958	7129	8722
负债及股东权益	5883	7131	9674	12203

基本指标

	2016A	2017E	2018E	2019E
EPS	0.613	0.624	0.897	1.222
BVPS	2.96	3.43	4.11	5.03
PE	35.21	34.59	24.05	17.67
PEG	1.36	1.34	0.93	0.68
PB	7.29	6.29	5.25	4.29
EV/EBITDA	28.49	27.55	19.46	14.35
ROE	20.7%	18.2%	21.8%	24.3%

Listed company in-depth

Research

LIU Taisheng, Steven

TMT

(852) 3465 5652

stevenliu@csci.hk

CHAN Ka Yeung, Duncan

Commodity

(852) 3465 5654

duncanchan@csci.hk

TIAN Yang

Automotive

(852) 3465 5775

tianyang@csci.hk

SUN Lingxiao, Roger

Industrials

(852) 3465 5785

rogersun@csci.hk

YAO Xue, Snowy

Power & coal

snowyyao@csci.hk

+852 3465 5675

SHEN Xiangfei, Thomas

(852) 3465 8689

thomasshen@csci.hk

XU Qiwen

(852) 3465 8690

xuqiwen@csci.hk

Institutional Sales & Trading

XIANG Xinrong, Ron

(852) 3465 5633

ronxiang@csci.hk

HO Wen Hao, Jack

(852) 3465 5685

jackho@csci.hk

WANG Zhuo, Gary

(852) 3465 8655

wangzhuo@csci.hk

LEE Ying Ju, Rose

(852) 3465 5707

roselee@csci.hk

LI Jiageng, Mike

(852) 3465 5636

mikeli@csci.hk

XIA Tian

(852) 3465 5670

xiatian@csci.hk

XU Xiaowei, Vincent

(852) 3465 5795

vincentxu@csci.hk

Company Rating Definition

The Benchmark: Hong Kong Hang Seng Index; Time Horizon: 12 months

Buy	12-month absolute total return: $\geq 10\%$
Hold	12-month absolute total return: $> -10\%$ but $< 10\%$
Sell	12-month absolute total return: $\leq -10\%$

Disclosure of Interests

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China Securities (International) Research

18/F, Two Exchange Square, Central, Hong Kong

Tel: (852) 34655600 Fax: (852) 21809495

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