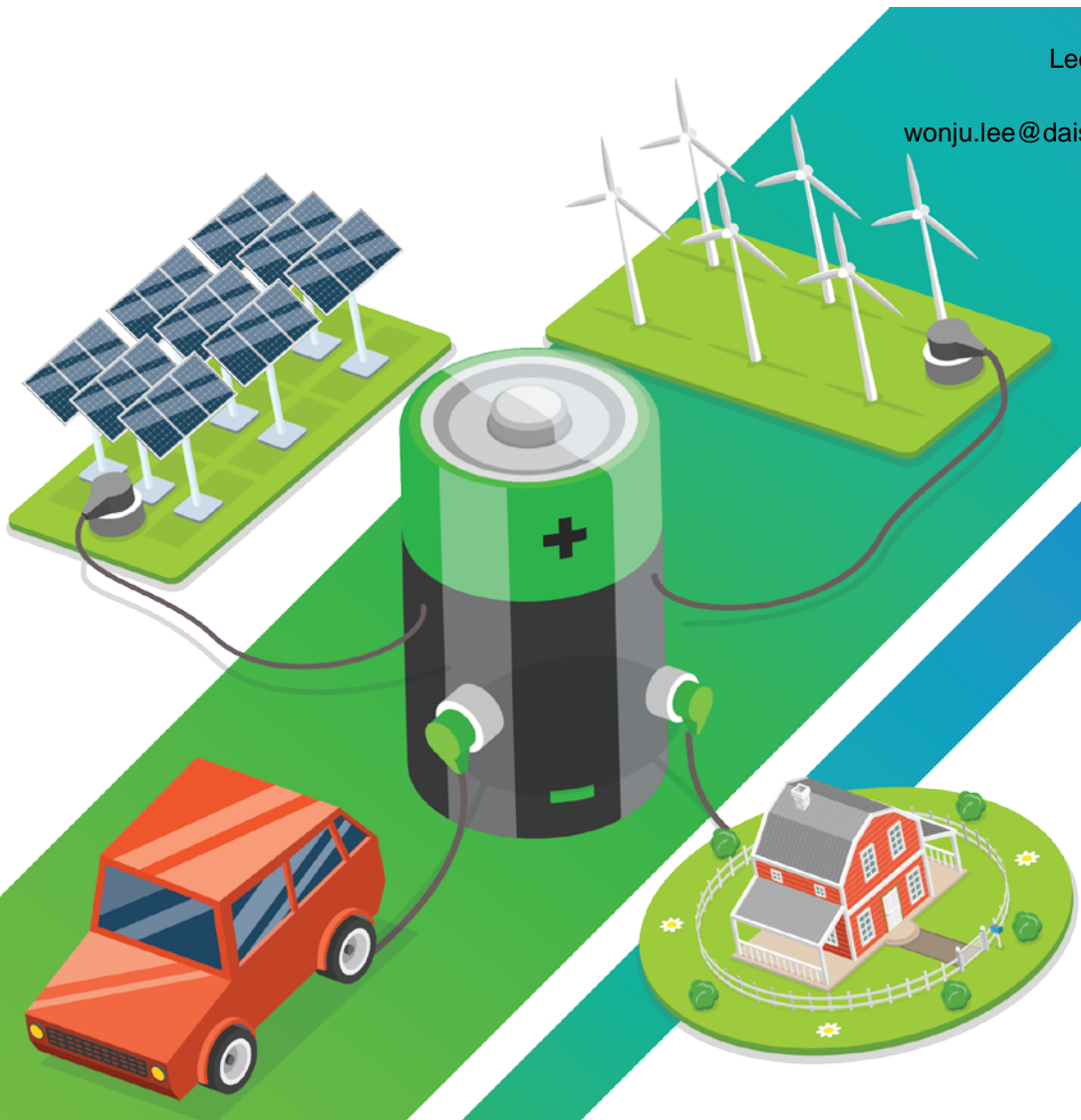


# Future energy sources

Identifying materials suppliers that stand to benefit from EV market expansion

Lee Won-ju  
Analyst

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### **Coverage initiated on the rechargeable battery materials industry with OVERWEIGHT**

- We predict the electric vehicle (EV) market to reach 14.5 million units by 2025, growing at a CAGR of 31.5% from 2017 to 2025, which compares with the market's projection of 12 million (28.6%). In reflection of our rosier outlook, we initiate coverage with an OVERWEIGHT rating.
- We view that annual EV sales volume will grow, but no higher than 31.5% as it would prevent the prices of cobalt and lithium (raw materials of car batteries) from falling. This is important as price declines in raw materials are a prerequisite for EV market growth.
- Our mid to long-term top pick is POSCO Chemical (003670 KQ). The company not only has strong partnerships with domestic battery vendors that supply to global top-tier EV OEMs, but also the capacity to scale up production in pace with the growth of the EV battery market thanks to its large scale of operation.

### **[Industry] Key variable to consider in EV sales outlook is the supply of raw materials**

- Automotive battery prices are widely predicted to fall just like other IT products, most of which experienced price declines led by increased production and technological advances. That said, car battery prices may not move as expected should raw material prices increase.
- Variable costs are an important consideration in this field. Products whose prices have decreased over time, such as display panels, semiconductors, and solar cells, are all made from silicon, the second most abundant element in the Earth's crust (about 28% by mass). In contrast, cobalt and nickel are quite rare, making up only 0.0023% and 0.0055% of the Earth's crust.
- Lithium-ion batteries are now one-fifth of what they cost in 2010, but this is mostly due to a fall in fixed costs, not variable costs. The share of variable costs is estimated to rise above 60% in 2019, which means that an increase in metal prices would make it nearly impossible for battery makers to lower their product prices.
- The limited supply of raw materials (cobalt, nickel) will put the lid on the pace of EV sales. We predict EV sales to expand at a CAGR of 31.5% in terms of volume through 2025.
- 1) Cobalt will remain in oversupply until 2025 with a build-up of 18,000 tons as a result of a number of cobalt mining projects launched in 2017 amid soaring prices.
- 2) Nickel will be in excess demand to the tune of 128,000 tons in 2025 due to a lack of investment in sulfide ores in advance. (High-purity nickel used in batteries is extracted from sulfide ores.)
- 3) Copper will also be in excess demand to the extent of 539,000 tons in 2025. The copper market will be impacted by continued declines in the grade of copper ores, depleting open-pit mines, and the prolonged downtrend in copper prices that has discouraged new copper mining projects.
- 4) Lithium will see supply exceed demand by 88,000 tons in 2025 due to a slate of mining projects that were launched in 2017 due to soaring prices.
- Combined, the cost of such metals used in battery production is forecast to fall about 23% in 2025 from 2018's.

### **[Stock] Buy companies that can expand production capacity as fast as EV market grows**

- Long-term growth in the battery materials space requires two things: partnerships with global top-tier car battery manufacturers and the capability to expand production in line with EV market growth.
- Our sector top pick is POSCO Chemical (target price W65,000, BUY), which supplies anode and cathode materials to global top-tier car battery makers and is financially capable to scale up production in tandem with EV market growth.

# POSCO Chemical (003670 KQ)

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Rating **BUY**  
initiate

6M TP (₩) **65,000**  
initiate

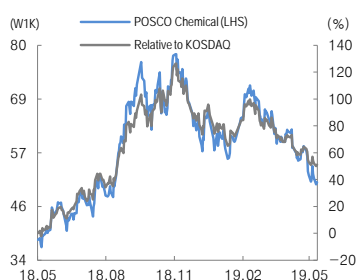
CP (₩)  
(19.05.21) **50,700**

Batteries / IT Energy & Components

Industry 4.0 safety rating ■ Sky Blue

KOSDAQ	703.98
Market cap (Wbn)	3,092
Market cap portion (%)	1.28
Paid-in capital (common; Wbn)	30
52w high/low (₩)	78,100 / 39,650
120d avg. trading volume (Wbn)	36.0
Foreign ownership (%)	9.94
Major shareholders	POSCO+1: 65.40%

(%)	1M	3M	6M	12M
Abs. return	-13.0	-28.1	-32.3	27.9
Rel. return	-5.8	-23.7	-33.1	58.6



## Solid order backlog

### Mid- to long-term top pick; BUY and 6M TP of ₩65,000

- POSCO Chemical has been able to secure orders for automotive anode materials thanks to its strong financials (which enables it to catch up with the pace of capacity expansions at battery makers) and a stable supply of lithium from POSCO.
- Having won orders from a leading battery manufacturer in the EV market that is still in its early stages, the company looks set to benefit as the market takes off.
- The target price of ₩65,000 is based on the 12MF EPS of 29x (average P/E for 2H18 when expectations were running high for EV market expansion).

### A partnership candidate favored by battery manufacturers

- 1) Sound financials: POSCO Chemical plans to invest ₩600bn in production facilities (anode and cathode materials) in 2019-2020. For this, the company will need to borrow ₩400-500bn, which will be not a big concern given its low current debt ratio (25% as of 2018). Besides, non-battery businesses will provide a stable cash flow of about ₩100bn a year for the company.
- 2) Stable procurement of lithium: The company has access to a steady supply of lithium thanks to its parent company POSCO, which is expected to produce 65,000 tons of lithium a year (lithium carbonate equivalent).
- With the additional capacity, the company is forecast to see OP increase at a CAGR of 19% in 2018-2023.

### Anode and cathode materials much more promising than needle cokes

- A number of factors point to a moderate price decline in needle cokes over the long haul.
- 1) Capacity expansions at China's electric arc furnaces are slowing due to narrow roll margins and eased environmental regulations (aimed at countering economic slowdown). This has led to a decline in demand for electrode bars (made from needle cokes) among electric arc furnaces.
- 2) The adoption rate of electro-graphite will decline as prices continue to remain high (10x more expensive than natural graphite) amid tight supply. (The steel and petrochemicals industries, where electro-graphite is produced as a by-product, are growing slowly, unable to keep up with the robust 30% annual growth of the EV market.) Thus, natural graphite (which is cheaper than electro-graphite) will be adopted in the production of automotive cathode materials. (POSCO Chemical produces natural graphite.)
- The company has begun to expand the production capacity of automotive anode material called NCM 622 in order to fulfill the order for a leading domestic battery maker (mass production scheduled for 2020).

### Operating results and major financial data

(Wbn, ₩, x, %)

	2017A	2018A	2019F	2020F	2021F
Revenue	1,197	1,384	1,589	1,937	2,308
OP	104	106	117	160	187
Pretax profit	126	177	170	196	213
NP	104	133	128	147	160
NP (controlling int.)	104	132	127	146	160
EPS	1,753	2,237	2,108	2,401	2,617
PER	22.7	28.5	24.0	21.1	19.4
BPS	10,910	12,690	14,138	16,009	18,226
PBR	3.6	5.0	3.5	3.1	2.8
ROE	17.2	19.0	15.9	16.0	15.3

Note: EPS, BPS, and ROE are based only on the controlling interest.  
Source: POSCO Chemical, Daishin Securities Research Center

## Financial statements

Income statement	(Wbn)				
	2017A	2018A	2019F	2020F	2021F
Revenue	1,197	1,384	1,589	1,937	2,308
Cost of goods sold	1,042	1,218	1,402	1,691	2,018
Gross profit	156	166	187	246	290
SG&A expenses	52	60	70	86	103
OP	104	106	117	160	187
OP margin	8.7	7.7	7.4	8.3	8.1
EBITDA	118	123	145	214	255
Non-OP	22	70	53	36	26
Income from affiliates	29	71	65	71	74
Financial revenue	4	6	3	3	3
FX related gains	0	0	0	0	0
Financial expense	-5	-4	-13	-36	-48
FX related losses	2	2	2	2	2
Others	-6	-3	-3	-3	-3
Income before taxes	126	177	170	196	213
Income tax expense	-22	-44	-42	-49	-53
Income from cont. op.	104	133	128	147	160
Income from discount. op.	0	0	0	0	0
NP	104	133	128	147	160
NP margin	8.7	9.6	8.1	7.6	6.9
NP for non-contr. interest	0	1	1	1	1
NP for contr. interest	104	132	127	146	160
Valuation of AFS fin. assets	0	0	0	0	0
Other compreh. income	-1	-1	-1	-1	-1
Comprehensive income	99	125	121	140	153
Comp. income for non-contr. Int.	0	1	1	1	1
Comp. income for contr. int.	100	125	120	139	152

Valuation metrics	(W, x, %)				
	2017A	2018A	2019F	2020F	2021F
EPS	1,753	2,237	2,108	2,401	2,617
PER	22.7	28.5	24.0	21.1	19.4
BPS	10,910	12,690	14,138	16,009	18,226
PBR	3.6	5.0	3.5	3.1	2.8
EBITDAPS	2,000	2,076	2,397	3,511	4,174
EV/EBITDA	18.6	29.8	21.6	16.3	14.4
SPS	20,267	23,423	26,294	31,756	37,844
PSR	2.0	2.7	2.0	1.6	1.4
CFPS	2,167	2,406	2,683	3,795	4,458
DPS	350	400	400	400	400

Financial ratios	(W, x, %)				
	2017A	2018A	2019F	2020F	2021F
<b>Growth potential</b>					
Revenue growth	7.1	15.6	14.8	21.9	19.2
OP growth	21.8	22	10.5	36.2	17.1
NP growth	133.5	27.7	-3.6	14.9	9.0
<b>Profitability</b>					
ROIC	28.3	20.1	16.1	14.0	11.8
ROA	13.3	11.9	10.9	11.1	10.1
ROE	17.2	19.0	15.9	16.0	15.3
<b>Stability</b>					
Debt ratio	28.2	25.0	39.2	70.0	79.6
Net borrowings ratio	-24.3	-15.5	2.7	40.1	50.7
Interest coverage ratio	68.5	68.6	10.8	4.7	4.0

Source: POSCO Chemical, Daishin Securities Research Center

Balance sheet	(Wbn)				
	2017A	2018A	2019F	2020F	2021F
Current assets	468	440	468	499	583
Cash & cash equiv.	104	120	116	74	81
Trade & other receive.	177	182	209	254	303
Inventories	99	109	125	152	182
Other current assets	88	29	19	18	17
Long-term assets	368	508	734	1,180	1,436
Tangible assets	183	264	431	807	990
Investments in affiliates	117	187	252	322	395
Other long-term assets	68	57	51	51	51
Total assets	836	948	1,202	1,678	2,019
Current liabilities	159	153	272	594	768
Payables & other liab.	139	125	138	161	185
Borrowings	0	0	110	410	560
Current portion of LT debts	5	4	0	0	0
Other current liabilities	15	23	23	23	23
Long-term liabilities	25	37	67	97	127
Borrowings	23	16	46	76	106
Convertible securities	0	0	0	0	0
Other long-term liab.	2	21	21	21	21
Total liabilities	184	189	338	691	895
Controlling interest	644	750	854	976	1,112
Capital stock	30	30	30	30	30
Capital surplus	24	24	24	24	24
Retained earnings	595	699	803	925	1,060
Other capital changes	-4	-3	-3	-3	-3
Non-controlling interest	8	9	10	11	13
Total shareholder's equity	652	758	864	987	1,124
Net borrowings	-159	-117	24	396	570

Cash flow statement	(Wbn)				
	2017A	2018A	2019F	2020F	2021F
Operating cash flows	56	85	67	86	106
NP	104	133	128	147	160
Non-cash items	24	9	34	84	112
Depreciation	14	16	27	54	67
FX gains	0	0	-1	-1	-1
Equity method gain	-29	-71	-65	-71	-74
Others	38	64	72	102	119
Chg in assets & liab.	-48	-37	-43	-63	-67
Other cash flows	-25	-20	-53	-82	-99
Investing cash flow	-46	-39	-253	-499	-323
Investment assets	0	1	-59	-70	-73
Tangible assets	-58	-101	-194	-429	-250
Others	11	61	1	1	1
Financing cash flows	-23	-29	113	306	156
Short-term borrowings	-5	0	110	300	150
Bonds payable	0	0	0	0	0
Long-term borrowings	0	0	30	30	30
Rights offering	0	0	1	0	0
Cash dividends	-18	-21	-24	-24	-24
Others	0	-9	-4	0	0
Net chg in cash	-14	16	-5	-42	7
Beginning cash balance	118	104	120	116	74
Ending cash balance	104	120	116	74	81
NOPLAT	86	80	88	120	141
FCF	40	-8	-79	-255	-43

# ILJIN Materials (020150 KS)

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Rating **BUY**  
initiate

6M TP (W) **46,000**  
initiate

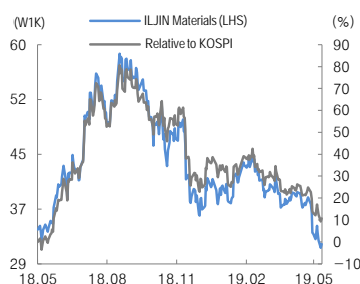
CP (W)  
(19.05.21) **31,800**

Batteries / IT Energy &amp; Components

Industry 4.0 safety rating ■ Sky Blue

KOSPI	2,061.25
Market cap (Wbn)	1,466
Market cap portion (%)	0.11
Paid-in capital (common; Wbn)	23
52w high/low (W)	58,700 / 31,250
120d avg. trading volume (Wbn)	17.5
Foreign ownership (%)	4.78
Major shareholders	Heo Jae-myeong+3: 53.37% National Pension Service: 7.16%

(%)	1M	3M	6M	12M
Abs. return	-18.8	-27.4	-33.1	-8.0
Rel. return	-12.7	-21.5	-32.6	10.1



## Initiation

# Financially sufficient for capacity expansion

### BUY and 6M TP of W46,000

- Unlike peers, ILJIN Materials is capable of expanding production capacity without external financing. As an electrofoil (copper foil) producer, the company is relatively insulated from price declines in raw materials, which can negatively impact product prices and fixed cost. And with the government's planned release of the revised ESS safety rules in June, the company will likely move past the ESS-related issue in 2H19.
- The target price of W65,000 is derived by applying a target P/E of 37x (average multiple in 1H18 when the ESS issue had not broken out yet, but there were market concerns over the potential IPO of its rival KCFT).

### Sum of cash holding and operating cash flow exceeds capex required

- The company plans to spend W160-200bn a year in capex through 2020 to expand its I2B production capacity from 16,000 tons in 2018 to 46,000 in 2020.
- Considering its cash holding (W100bn) and annual operating cash flow (more than W100bn), we believe ILJIN Materials can carry out that capex plan without external financing.
- While the debt-free expansion may be somewhat conservative, its OP is projected to grow at a CAGR of 26% through 2020. This sharply contrasts with other battery materials suppliers, which have to rely on borrowings to catch up with battery manufacturers' rapid capacity expansions.

### Relatively shielded from price risks

- Automotive anode materials vendors are likely to see both fixed cost burden grow as product prices drop and margins rise from economies of scale as the prices of cobalt and lithium slide.
- But the price of copper, the raw material the company needs to produce electrofoil, is projected to climb due to the lack of preemptive investment which will continue to keep demand on the boil.
- Our earnings forecast is based on conservative assumptions given the following. First, a rise in copper prices could squeeze margins of the company, which supplies electrofoil to major customers on a quarterly basis but pays for the raw material (copper) at spot prices. (The contract terms and conditions could be revised later, however.) Second, the capacity expansion at KCFT could hurt the company's processing margins. (OP margin is forecast at 11% in 2019 and 10.7% in 2020.)

### Operating results and major financial data

(Wbn, W, x, %)

	2017A	2018A	2019F	2020F	2021F
Revenue	454	502	597	722	942
OP	50	49	66	77	98
Pretax profit	42	54	70	81	101
NP	42	41	54	62	78
NP (controlling int.)	42	41	54	62	78
EPS	1,000	897	1,171	1,353	1,687
PER	38.3	45.7	27.2	23.5	18.8
BPS	12,573	11,472	12,486	13,789	15,459
PBR	3.0	3.6	2.5	2.3	2.1
ROE	10.3	7.8	9.8	10.3	11.5

Note: EPS, BPS, and ROE are based only on the controlling interest.  
Source: ILJIN Materials, Daishin Securities Research Center

## Financial statements

Income statement						(Wbn)
	2017A	2018A	2019F	2020F	2021F	
Revenue	454	502	597	722	942	
Cost of goods sold	373	422	498	599	780	
Gross profit	81	80	99	123	162	
SG&A expenses	31	31	33	46	64	
OP	50	49	66	77	98	
OP margin	10.9	9.7	11.0	10.7	10.4	
EBITDA	73	73	120	149	177	
Non-OP	-8	5	4	4	4	
Income from affiliates	0	0	0	0	0	
Financial revenue	5	11	6	6	6	
FX related gains	1	3	3	3	3	
Financial expense	-6	-6	-2	-2	-3	
FX related losses	5	4	0	0	0	
Others	-7	0	0	0	0	
Income before taxes	42	54	70	81	101	
Income tax expense	1	-12	-16	-19	-23	
Income from cont. op.	42	41	54	62	78	
Income from discount. op.	0	0	0	0	0	
NP	42	41	54	62	78	
NP margin	9.3	8.2	9.0	8.6	8.3	
NP for non-contr. interest	0	0	0	0	0	
NP for contr. interest	42	41	54	62	78	
Valuation of AFS fin. assets	1	0	0	0	0	
Other compreh. income	0	-2	-2	-2	-2	
Comprehensive income	54	25	38	46	62	
Comp. income for non-contr. Int.	0	0	0	0	0	
Comp. income for contr. int.	54	25	38	46	62	

Valuation metrics						(W, x, %)
	2017A	2018A	2019F	2020F	2021F	
EPS	1,000	897	1,171	1,353	1,687	
PER	38.3	45.7	27.2	23.5	18.8	
BPS	12,573	11,472	12,486	13,789	15,459	
PBR	3.0	3.6	2.5	2.3	2.1	
EBITDAPS	1,733	1,595	2,594	3,224	3,844	
EV/EBITDA	20.8	25.0	11.4	9.5	8.0	
SPS	10,762	10,899	12,942	15,650	20,432	
PSR	3.6	3.8	2.5	2.1	1.6	
CFPS	1,723	1,733	2,717	3,347	3,966	
DPS	650	0	0	0	0	

Financial ratios						(W, x, %)
	2017A	2018A	2019F	2020F	2021F	
<b>Growth potential</b>						
Revenue growth	13.8	10.6	18.9	20.9	30.5	
OP growth	70.6	-1.6	34.9	17.3	26.6	
NP growth	3.9	-2.1	30.7	15.5	24.7	
<b>Profitability</b>						
ROIC	18.4	11.5	10.9	9.9	10.8	
ROA	9.5	7.3	9.1	9.8	11.2	
ROE	10.3	7.8	9.8	10.3	11.5	
<b>Stability</b>						
Debt ratio	22.6	31.0	30.4	29.8	29.2	
Net borrowings ratio	-45.0	-10.5	-17.7	-7.7	-6.1	
Interest coverage ratio	115.9	33.9	47.9	42.5	43.3	

Source: ILJIN Materials, Daishin Securities Research Center

Balance sheet						(Wbn)
	2017A	2018A	2019F	2020F	2021F	
Current assets	395	357	313	299	354	
Cash & cash equiv.	46	53	106	62	65	
Trade & other receive.	70	81	95	112	142	
Inventories	59	51	61	74	96	
Other current assets	220	172	51	51	51	
Long-term assets	256	335	438	527	567	
Tangible assets	176	271	418	507	547	
Investments in affiliates	0	0	0	0	0	
Other long-term assets	80	63	21	20	20	
Total assets	650	692	751	825	921	
Current liabilities	89	109	117	129	144	
Payables & other liab.	69	79	83	89	99	
Borrowings	8	13	19	25	31	
Current portion of LT debts	0	2	0	0	0	
Other current liabilities	12	15	15	15	15	
Long-term liabilities	31	55	58	61	64	
Borrowings	4	5	8	11	14	
Convertible securities	0	0	0	0	0	
Other long-term liab.	27	49	49	49	49	
Total liabilities	120	164	175	190	208	
Controlling interest	530	528	576	636	713	
Capital stock	23	23	23	23	23	
Capital surplus	379	385	385	385	385	
Retained earnings	96	110	164	226	304	
Other capital changes	32	10	4	1	0	
Non-controlling interest	0	0	0	0	0	
Total shareholder's equity	530	528	576	636	713	
Net borrowings	-238	-56	-102	-49	-43	

Cash flow statement						(Wbn)
	2017A	2018A	2019F	2020F	2021F	
Operating cash flows	61	86	94	114	120	
NP	42	41	54	62	78	
Non-cash items	31	39	71	92	105	
Depreciation	24	25	54	72	80	
FX gains	3	0	-3	-3	-3	
Equity method gain	0	0	0	0	0	
Others	4	14	20	23	28	
Chg in assets & liab.	-11	6	-16	-21	-39	
Other cash flows	0	0	-16	-19	-24	
Investing cash flow	-220	-62	-162	-165	-125	
Investment assets	-162	42	42	0	0	
Tangible assets	-18	-119	-200	-160	-120	
Others	-40	15	-5	-5	-5	
Financing cash flows	180	-18	7	9	9	
Short-term borrowings	-3	6	6	6	6	
Bonds payable	0	0	0	0	0	
Long-term borrowings	2	3	3	3	3	
Rights offering	200	3	0	0	0	
Cash dividends	-2	-30	0	0	0	
Others	-16	0	-2	0	0	
Net chg in cash	20	7	53	-44	3	
Beginning cash balance	27	46	53	106	62	
Ending cash balance	46	53	106	62	65	
NOPLAT	50	37	51	59	75	
FCF	57	-57	-96	-29	35	

**[Compliance Notice]**

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**[Investment ratings framework]**

Sector ratings breakdown	Company ratings breakdown
- Overweight: industry indicators are expected to outperform the market over the next six months.	- Buy: the stock is expected to outperform the market by at least 10%p over the next six months.
- Neutral: industry indicators are expected to be in line with the market over the next six months.	- Marketperform: the stock is expected to either outperform or underperform the market by less than 10%p over the next six months.
- Underweight: industry indicators are expected to underperform the market over the next six months.	- Underperform: the stock is expected to underperform the market by at least 10%p over the next six months.

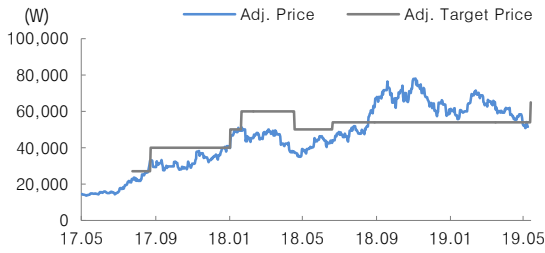
**[Investment rating breakdown]**

	BUY	MARKETPERFORM	UNDERPERFORM
Ratio	88.6%	11.4%	0.0%

(As of May 19, 2019)

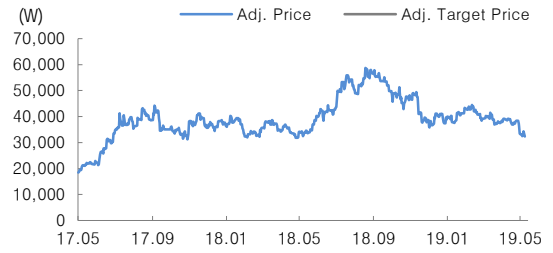
## [Investment rating & Target price history]

POSCO Chemical (003670 KQ)



Date	19.05.22		18.06.29	18.05.09	18.04.27	18.04.04
Rating	BUY	Analyst	BUY	BUY	BUY	BUY
Target price	65,000	changed	54,000	50,000	50,000	60,000
Diff. (avr. %)			13.63	(17.47)	(28.48)	(24.38)
Diff. (max/min, %)			44.63	(7.20)	(26.40)	(14.67)
Date	18.02.05	18.01.29	18.01.11	17.11.17	17.10.17	17.09.18
Rating	BUY	BUY	BUY	BUY	BUY	BUY
Target price	60,000	60,000	50,000	40,000	40,000	40,000
Diff. (avr. %)	(21.05)	(16.42)	(2.71)	(17.67)	(23.91)	(23.38)
Diff. (max/min, %)	(14.67)	(14.67)	2.00	2.00	(5.63)	(17.00)
Date	17.09.05	17.09.01	17.08.21	17.08.02		
Rating	BUY	BUY	BUY	BUY		
Target price	40,000	40,000	27,000	27,000		
Diff. (avr. %)	(22.73)	(17.50)	(7.69)	(15.89)		
Diff. (max/min, %)	(17.50)	(17.50)	22.22	(6.48)		
Date						
Rating						
Target price						
Diff. (avr. %)						
Diff. (max/min, %)						

ILJIN Materials (020150 KS)



Date	19.05.22					
Rating	BUY	Analyst				
Target price	46,000	changed				
Diff. (avr. %)						
Diff. (max/min, %)						
Date						
Rating						
Target price						
Diff. (avr. %)						
Diff. (max/min, %)						
Date						
Rating						
Target price						
Diff. (avr. %)						
Diff. (max/min, %)						