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# Lithium

Liquidity pressures weigh heavy across H2 supply chain

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## Authors

Andrew Miller  
Senior Analyst  
Office: +1 754 248 3812  
[amiller@benchmarkminerals.com](mailto:amiller@benchmarkminerals.com)

Albert (Qi) Li  
Analyst  
[ali@benchmarkminerals.com](mailto:ali@benchmarkminerals.com)

## Managing Director

Simon Moores

## Benchmark Mineral Intelligence

[www.benchmarkminerals.com](http://www.benchmarkminerals.com)  
[info@benchmarkminerals.com](mailto:info@benchmarkminerals.com)

- **Benchmark Lithium Price Index** falls over 7% as ROW prices approach China levels; carbonate down 17.8% and hydroxide down 22.5% ytd, on average
- H2 renegotiations highlight excess supply pressures; low spodumene prices allow for further adjustment in Chinese chemical pricing
- Downstream inventories and liquidity issues set to stunt H2 demand growth as battery producers put pressures on upstream costs
- Spodumene production increases as Pilabra and Altura extend offtake deals; Galaxy exceeds target output at Mt Cattlin and proportion of 6% supply increases at Mt Marion
- Nemaska receives LOI from Pallinghurst Group for Whabouchi financing
- China-US trade war weighs heavy on industrial markets as macroeconomic pressures build; prices into Europe reach new lows
- Albemarle revises Wodgina partnership, adding Kemerton capacity to 60:40 JV split
- Infund Holdings signs agreement with YLB to develop Bolivian lithium resources

## LITHIUM GRADES

### LITHIUM CARBONATE

Lithium Carbonate, FOB South America  
Lithium Carbonate, CIF North America  
Lithium Carbonate, CIF Asia  
Lithium Carbonate, CIF Europe  
Lithium Carbonate, EXW China (Battery grade)  
Lithium Carbonate, EXW China (Technical grade)

### LITHIUM HYDROXIDE

Lithium Hydroxide, FOB North America  
Lithium Hydroxide, CIF Asia  
Lithium Hydroxide, CIF Europe  
Lithium Hydroxide, EXW China

### LITHIUM FEEDSTOCK

Spodumene concentrate, FOB Australia

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# -7.3%

the decrease in the BMI  
Lithium Price Index  
throughout July 2019

LITHIUM CARBONATE (WEIGHTED AVERAGE)	
Current price	\$10,041
Last price	\$10,955
% change	-8.35%

LITHIUM HYDROXIDE (WEIGHTED AVERAGE)	
Current price	\$12,681
Last price	\$13,366
% change	-5.12%

SPODUMENE CONCENTRATE (6% Li2O)	
Current price	\$585
Last price	\$615
% change	-4.88%

Source: Benchmark Mineral Intelligence

## 1 July 2019 Review

Concerns over H2 demand growth intensified throughout July 2019, with macroeconomic concerns impacting new orders from industrial markets, and downstream pressures in China's EV market causing a backlog in upstream inventories.

As a result there was less liquidity - particularly in the Chinese market - than usually seen moving into H2. Some orders were reported to have either been cancelled or volumes reduced as a result of uncertainty over the direction of the market in the coming months.

Although China has reduced its expected EV output for 2019 off the back of the country's subsidy adjustment, there is still healthy growth expected in global battery demand and sources have told **Benchmark Minerals** that they expect orders to increase when cathode inventories wind down.

In the near-term this slowdown in growth is expected to see a further adjustment in prices, which slumped once again moving into H2. Carbonate prices came under particular pressure in July as Chinese and South American producers lowered offers to clear volumes.

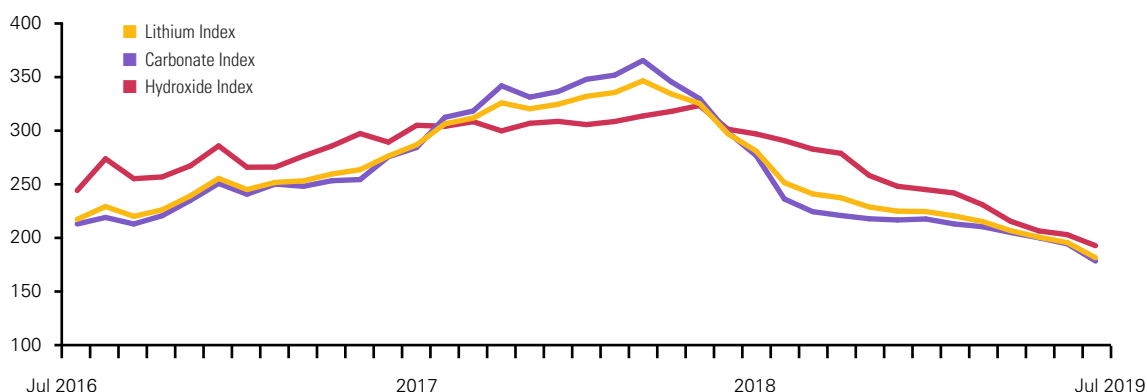
Hydroxide prices fell by over 5% on average, but still maintained a premium on carbonate sales. This premium is however expected to narrow further in the coming months with capacity expansions ongoing.

In the near-term, these converter expansions are focused largely among Tier 1 producers, with Tianqi progressing its stage 1 project in Australia, and Albemarle pushing forward with its Xinyu expansion.

Longer-term hopes for new producers were however boosted in July, with news that mining investor, Pallinghurst Group, had submitted a letter of intent to complete the financing of Nemaska Lithium's Whabouchi project.

In addition, Mineral Resources adjusted the terms of its JV with Albemarle for the development of Wodgina, increasing Albemarle's stake in Wodgina to 60%. The 60:40 JV split will be extended to include Kemerton facilities, while putting on hold an adjoining hydroxide plant at Wodgina, which will lower the upfront capital investment for both parties.

### Benchmark Lithium Price Index

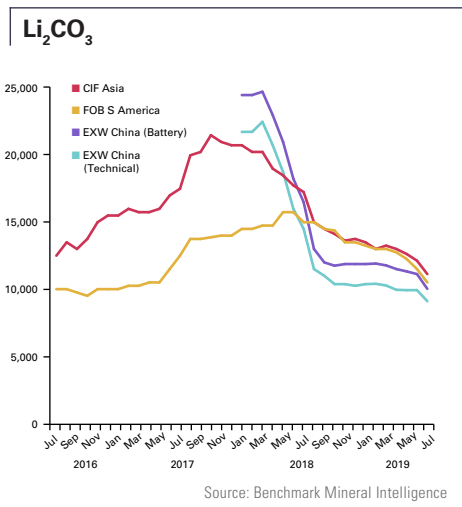


Source: Benchmark Mineral Intelligence

	1M	Y-O-Y	YTD	TODAY	LAST
LITHIUM INDEX	-7.3%	-35.7%	-12.3%	181.0	195.2
CARBONATE INDEX	-8.4%	-35.8%	-13.1%	177.8	194.0
HYDROXIDE INDEX	-5.1%	-35.3%	-10.7%	192.3	202.6

## 2 Prices

### Lithium Carbonate



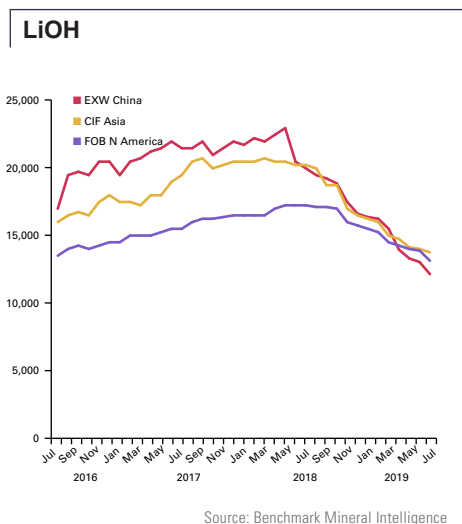
	1M	Y-O-Y	YTD	TODAY	LAST
Li <sub>2</sub> CO <sub>3</sub> , FOB SOUTH AMERICA	-8.70%	-30.00%	-22.22%	\$10,500	\$11,500

The **Benchmark Minerals' Lithium Carbonate Price Index** slumped to its lowest point since April 2016 in July, as Chinese prices fell by up to 10% on H2 contracts. Lower feedstock costs, coupled with oversupply that has intensified over the peak summer months of production, has seen lower offers in recent weeks as suppliers push to secure orders.

In addition, concerns from cathode producers over the direction of lithium ion battery demand in H2 have seen some consumers reduce or cancel orders, adding to stocks. Domestic lithium carbonate prices in China (EXW) fell by 8.3% for technical grade sales and 9.9% for battery grade material, with sales reported to be lower than usual for the time of year.

South American producers also sought to place H2 volumes by lowering prices, with average prices out of the region down 8.7% (FOB) to an average of \$10,500/tonne for the month. Lower offers saw more decreases in prices into industrial markets, and sales into Asia's battery sector also fell, with prices down to a range of \$10,250-\$12,000/tonne in July.

### Lithium hydroxide



	1M	Y-O-Y	YTD	TODAY	LAST
LiOH, FOB NORTH AMERICA	-5.41%	-23.91%	-16.67%	\$13,125	\$13,875

Lithium hydroxide prices continued to trend downwards moving into H2, however a significant premium over carbonate was maintained due to the tighter number of high-quality, qualified suppliers.

On average, global prices fell 5.1% through July 2019, down 22.5% ytd, with further decreases expected from most suppliers in H2.

There were notable decreases in China, where EXW prices fell 6.9% to an average of \$12,125/tonne. Prices out of North America also fell over 5% as H2 contract adjustments forced prices to between \$12,000-\$14,250/tonne.

There were fewer new contracts agreed throughout July with most consumers having sufficient volumes tied to longer-term agreements and some seeking to decrease orders in response to lower than expected battery growth and a delayed transition to high-nickel cathode chemistries.

### Feedstock

	1M	Y-O-Y	YTD	TODAY	LAST
SPODUMENE (6% Li <sub>2</sub> O), FOB AUSTRALIA	-4.88%	-36.07%	-33.14%	\$585	\$615

Spodumene prices came under more pressure in July 2019, with slow consumption of new material and the downstream lithium chemical price slump forcing lower prices. Prices fell to a new low of between \$550-620/tonne in July, with sales trending towards the lower end of this range throughout the month.

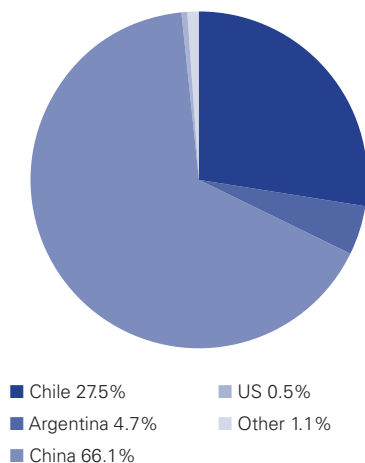
There are concerns that average prices could fall below the \$550/tonne level during Q3, which would put pressure on new operations that are still operating above target production costs.

Nevertheless, scale and processing improvements did see these costs fall in Q2 and this will likely continue over the coming months, providing scope for further decreases. Despite long-term interest growing, short-term sentiment in the market remains negative and is likely to see lower sales volumes over the coming weeks.

### 3 Supply

#### Lithium Chemical

Lithium supply (LCE): July 2019



Source: Benchmark Mineral Intelligence

There was a marginal decrease in global lithium chemical production in July 2019 as converters stalled production increases in response to lower than anticipated H2 orders. Falling prices, coupled with high downstream stocks and uncertainty over H2 demand growth, have encouraged many consumers – particularly in China – to hold back from orders, which has seen a response from the country's chemical producers.

Low utilisation rates among China's converters have been largely contained to smaller-scale producers, with Tier 1 and 2 operations still expanding to convert the influx of new spodumene supply seen over the past 12 months.

Outside of China, Orocobre reported a 12% increase in Q2 2019 output (down 3.9% yoy), with the company progressing stage 2 expansion plans at Olaroz.

New production in North America was given a boost by the news that investors Pallinghurst Group had submitted a letter of intent (LOI) for the \$600m CAD financing of Nemaska's Whabouchi project.

There were also developments in Bolivia, where Chinese company Infund Holdings announced plans to develop a new 30,000 tpa lithium chemical facility in partnership with state-owned, YLB.

Infund is already developing a 30,000 tpa facility in Qinghai province, but is yet to execute on this project, with initial production targeted for the end of 2019. This will likely provide a test-ground for the company to commercialise its technology to extract brine with high magnesium content.

#### Lithium Feedstock

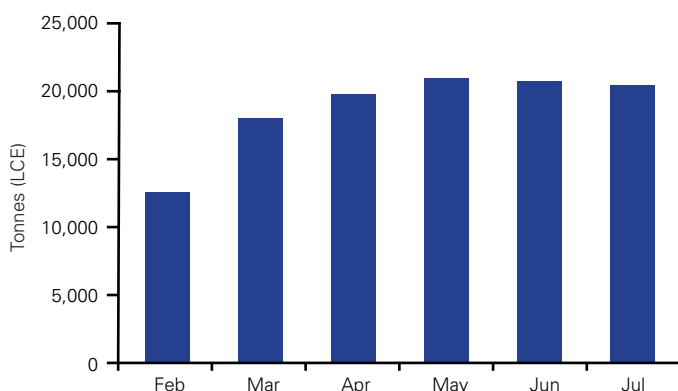
Australia's new spodumene projects continued to push towards capacity production levels moving into H2, despite recent plans to slow shipments in the near-term.

Alita Resources and Pilbara Minerals announced strong increases on Q2 production (vs Q1 2019), as did Altura Mining and Galaxy Resources, with both reporting operating costs at below \$400/tonne for Q2.

Mineral Resources reported a 15% decrease in output from Mt Marion in Q2, however the proportion of 6% concentrate output increased. The company also adjusted the terms of its Wodgina JV with Albemarle, providing the Chilean producer a 60% stake in both the mine and conversion facility. Mineral Resources are expecting to begin the ramp up of concentrate production from late 2019, although plans to develop adjoining hydroxide conversion capacity have been put on hold.

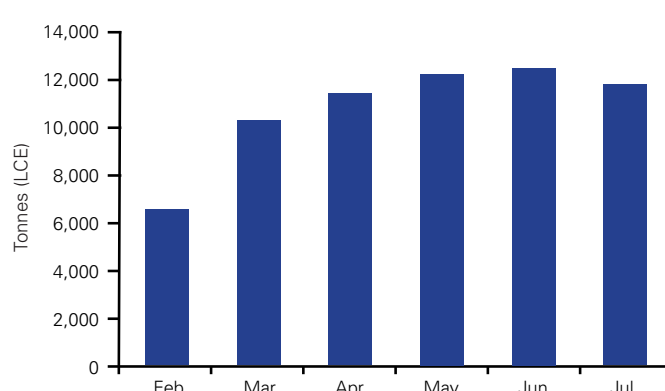
With converters and downstream users still showing strong interest in securing long-term volumes, feedstock producers are expected to moderate expansions, focusing on quality improvements until downstream demand picks up.

Supply: Lithium carbonate



Source: Benchmark Mineral Intelligence estimates

Supply: Lithium Hydroxide



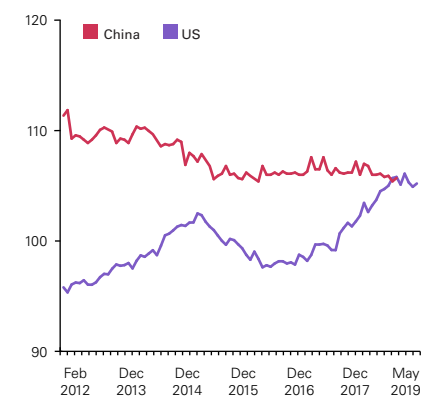
Source: Benchmark Mineral Intelligence estimates

### 4 Demand

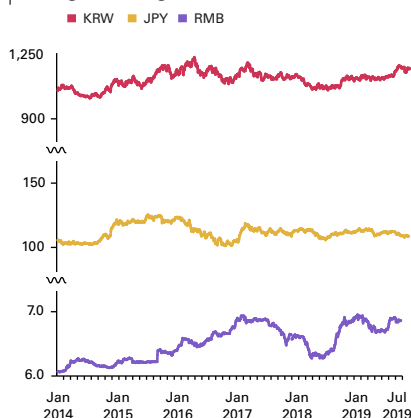
#### INDICATORS

		2018	Q2 2019	MAY	JUN	JUL
<b>BELGIUM</b>						
LUBRICANT INDICATOR*		-1.11%	-	-	-	-
INDUSTRIAL PRODUCTION	M-O-M	-	-	-1.10%	-	-
	Y-O-Y	-	-	5.40%	-	-
<b>CHINA</b>						
EV PRODUCTION		59.82%	25.18%	9.80%	19.64%	-
CERAMICS INDICATOR**		-3.35%	26.90%	13.21%	-6.36%	-
INDUSTRIAL PRODUCTION	M-O-M	-	-	0.36%	0.68%	-
	Y-O-Y	-	-	5.00%	6.30%	-
<b>GERMANY</b>						
CERAMICS INDICATOR**		2.25%	-	-	-	-
INDUSTRIAL PRODUCTION	M-O-M	-	-	0.30%	-	-
	Y-O-Y	-	-	-3.70%	-	-
<b>JAPAN</b>						
LI-ION BATTERY SALES		-	-	105.09%	-	-
LITHIUM BATTERY EXPORTS		-1.85%	-	-	-	-
INDUSTRIAL PRODUCTION	M-O-M	-	-	200.00%	-3.60%	-
	Y-O-Y	-	-	-210.00%	-4.10%	-
<b>SOUTH KOREA</b>						
LITHIUM BATTERY EXPORTS		19.80%	-0.28%	-1.61%	-10.36%	-
INDUSTRIAL PRODUCTION	M-O-M	-	-	-1.70%	-	-
	Y-O-Y	-	-	-0.20%	-	-
<b>US</b>						
LUBRICANT INDICATOR*		-0.96%	-	-	-	-
INDUSTRIAL PRODUCTION	M-O-M	-	-	0.40%	0.00%	-
	Y-O-Y	-	-	2.10%	1.30%	-

Industrial production



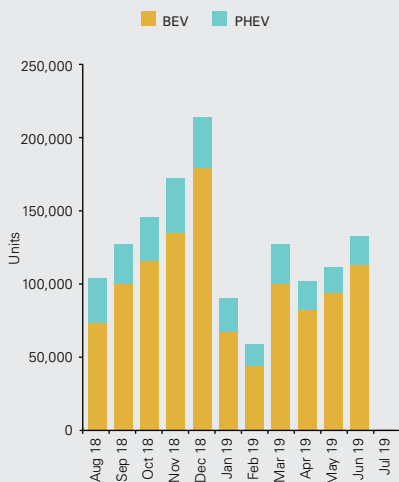
Foreign exchange



Source: Trading Economics; World Steel; US Federal Reserve; China Ministry of Industry and Information Technology; Battery Association of Japan; Intracen; OECD  
\* Lubricant indicator - trade statistics for exports of petroleum oils and preparations, including lithium-based lubricant greases.  
\*\* Ceramics indicator - trade statistics for exports of ceramics products

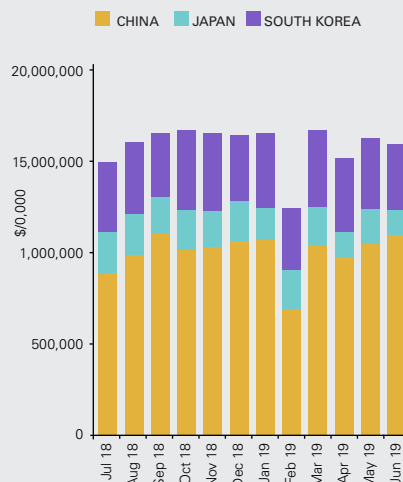
Source: Trading Economics; World Steel; US Federal Reserve; China Ministry of Industry and Information Technology; Battery Association of Japan; Intracen

CHINA NEV PRODUCTION



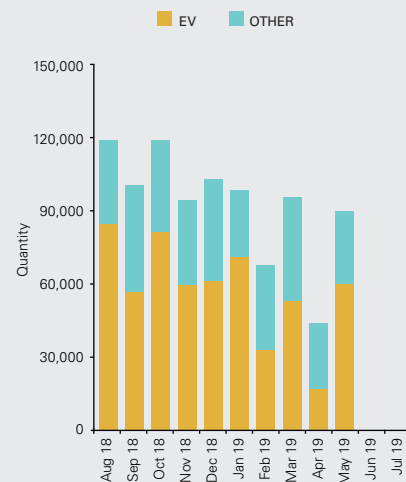
Source: China Ministry of Industry and Information Technology

LITHIUM BATTERY EXPORTS (VALUE)



Source: Intracen

JAPAN LI ION BATTERY SALES



Source: Battery Association of Japan

### Demand indicators

	JULY	SHORT TERM (0-3 MTHS)	MED TERM (3-6 MTHS)	LONG TERM (6-12 MTHS)
BELGIUM	→	→	↓	→
CHINA	↑	↑	↑	↑
GERMANY	→	→	↑	→
JAPAN	↑	↑	↑	↑
S KOREA	↓	↓	→	→
US	→	→	↑	→

## Demand trends

As liquidity issues raise questions over the long-term future of some planned battery expansions in China, commitments from Tier 1 and 2 producers continue to increase the long-term demand outlook for lithium.

South Korean major, LG Chem announced a further \$424m investment in the city of Gumi in July 2019, which will include a 60,000 tpa cathode production line. The plant is expected to begin production by the end of 2022 and the company is also rumoured to be considering a second battery plant in the US.

In addition, July saw major GWh-scale announcements from SVolt and CALB, which will likely accelerate the consolidation of smaller, less-competitive operations that have emerged in China in recent years.

Several of these smaller producers are facing significant liquidity issues in the wake of China's EV subsidy reduction, which has begun to see EV producers push for lower battery costs.

This is likely to force consolidation in China's battery sector and also put pressure on other areas of the supply chain that will limit demand growth in Q3.

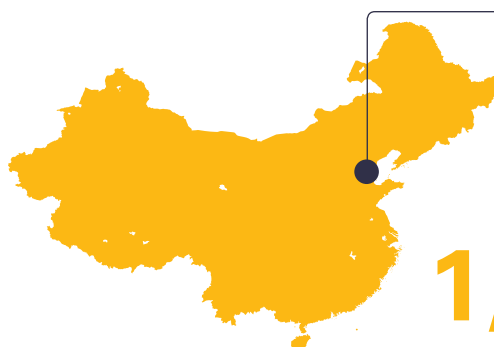
In addition, the high inventories that have built up in China's cathode market will likely delay orders over the coming months and make an increasingly competitive landscape for lithium chemical suppliers.

While high-quality, qualified suppliers will likely be able to maintain some premium, sales into industrial markets will become increasingly competitive in the short-term with excess capacities and a slowdown in demand.

European consumers have reported difficult end-market conditions and are unlikely to commit to new volumes outside of existing annual agreements over the coming months.

## Megafactory highlight

### Lishen



MEGAFACTORY PROFILE	
LOCATION	Tianjin, China
TARGET CAPACITY	20 GWh
STAGE	Production
CHEMISTRY	NCM, LCO
CAPACITY BY 2023	10 GWh

# 1,227.8 GWh

Total battery megafactory capacity in pipeline to 2023

Source: Benchmark Mineral Intelligence's Battery Megafactory Assessments

# BENCHMARK | LITHIUM PRICE ASSESSMENT

## JULY 2019

## 5 Company data

### STOCK PERFORMANCE\*

COMPANY	TICKER	COUNTRY	CURRENCY	MARKET CAP	SHARE PRICE	PREV MONTH SHARE PRICE	PERFORMANCE
<b>PRODUCERS</b>							
ALBEMARLE CORP	ALB	US	USD	7,800.00	73.93	69.07	▲
ALTURA MINING LTD	AJM	AUSTRALIA	AUD	212.55	0.10	0.12	▼
AMG NV	AMG	NETH'LANDS	EURO	814.30	25.92	27.3	▼
LIVENT CORP	LTHM	US	USD	966.53	6.59	6.92	▼
GALAXY RESOURCES LTD	GXY	AUSTRALIA	AUD	523.96	1.28	1.23	▲
JIANGXI SPECIAL ELECTRIC MOTOR CO LTD	002176	CHINA	RMB	7,150.00	4.19	4.87	▼
JIANGXI GANFENG LITHIUM CO LTD	002460	CHINA	CNY	25,920.00	22.11	23.43	▼
MINERAL RESOURCES	MIN	AUSTRALIA	AUD	3,020.00	16.07	14.98	▲
OROCOBRE LTD	ORE	AUSTRALIA	AUD	745.78	2.85	2.82	▲
PILBARA MINERALS LTD	PLS	AUSTRALIA	AUD	870.17	0.47	0.55	▼
SICHUANYAHUA INDUSTRIAL GROUP CO	002497	CHINA	RMB	6,120.00	6.38	6.99	▼
SOCIEDAD QUIMICA Y MINERA DE CHILE	SQM	US	USD	7,780.00	29.89	31.24	▼
ALITA RESOURCES LTD	A40	AUSTRALIA	AUD	121.07	0.08	0.14	▼
TIANQI LITHIUM INDUSTRIES INC	002466	CHINA	CNY	26,600.00	23.29	25.28	▼
YOUNGY CO LTD (RIONGJIE)	002192	CHINA	RMB	4,510.00	17.38	20.30	▼
<b>DEVELOPMENT STAGE</b>							
ABERDEEN INTERNATIONAL INC	AAB	CANADA	CAD	5.28	0.06	0.04	▲
ANSON RESOURCES LTD	ASN	AUSTRALIA	AUD	22.55	0.04	0.05	▼
ARDIDEN LTD	ADV	AUSTRALIA	AUD	5.07	0.00	0.00	▶
ARGOSY MINERALS LTD	AGY	AUSTRALIA	AUD	111.60	0.11	0.07	▲
AUROCH MINERALS LTD	AOU	AUSTRALIA	AUD	8.74	0.09	0.05	▲
AVALON ADVANCED MATERIALS INC	AVL	CANADA	CAD	16.44	0.06	0.08	▼
BACANORA MINERALS LTD	BCN	UK	GBP	61.52	45.75	1.32	▲
BIRIMIAN LIMITED	BGS	AUSTRALIA	AUD	34.39	0.13	0.14	▼
CADENCE MINERALS PLC	KDNC	UK	GBP	10.81	0.10	0.11	▼
CORE LITHIUM LTD	CXO	AUSTRALIA	AUD	33.90	0.04	0.04	▶
DAJIN RESOURCES CORP	DJI	CANADA	CAD	6.85	0.04	0.04	▶
EXORE RESOURCES	ERX	AUSTRALIA	AUD	35.38	0.08	0.07	▲
EUROPEAN LITHIUM LTD	EUR	AUSTRALIA	AUD	50.50	0.09	0.09	▶
EUROPEAN METALS HOLDINGS LTD	EHM	AUSTRALIA	AUD	58.66	0.40	0.36	▲
FRONTIER LITHIUM INC	FL.V	CANADA	CAD	45.77	0.29	0.31	▼
IONEER LTD	INR	AUSTRALIA	AUD	272.87	0.18	0.14	▲
INFINITY LITHIUM CORP	INF	AUSTRALIA	AUD	14.94	0.07	0.08	▼
INTERNATIONAL LITHIUM CORP	ILC	CANADA	CAD	5.97	0.04	0.06	▼
KIDMAN RESOURCES LTD	KDR	AUSTRALIA	AUD	765.07	1.89	1.88	▲
LAKE RESOURCES NL	LKE	AUSTRALIA	AUD	30.61	0.06	0.08	▼
LEPIDICO	LPD	AUSTRALIA	AUD	109.97	0.03	0.03	▶
LICO ENERGY METALS INC	LIC	CANADA	CAD	2.20	0.04	0.04	▶
LIONTOWN RESOURCES LTD	LTR	AUSTRALIA	AUD	215.51	0.14	0.10	▲
LITHIUM AMERICAS	LAC	CANADA	CAD	432.38	4.88	5.17	▼
LITHIUM AUSTRALIA NL	LIT	AUSTRALIA	AUD	28.25	0.05	0.06	▼
LITHIUM POWER INTERNATIONAL	LPI	AUSTRALIA	AUD	90.57	0.34	0.28	▲
NEMASKA LITHIUM INC	NMX	CANADA	CAD	245.81	0.29	0.25	▲
NEOMETALS LTD	NMT	AUSTRALIA	AUD	103.44	0.19	0.21	▼
NEO LITHIUM CORP	NLC	CANADA	CAD	72.85	0.63	0.65	▼
PROSPECT RESOURCES LTD	PSC	AUSTRALIA	AUD	43.65	0.18	0.23	▼
NEVADA ENERGY METALS	BFF	CANADA	CAD	1.20	0.10	0.12	▼
PIEDMONT LITHIUM LTD	PLL	AUSTRALIA	AUD	118.23	0.14	0.16	▼
PREMIER AFRICAN MINERALS	PREM	UK	GBP	4.99	0.04	0.06	▼
PURE ENERGY MINERALS	PE	CANADA	CAD	15.25	0.08	0.09	▼
SAVANNAH RESOURCES PLC	SAV	UK	GBP	45.83	4.38	4.88	▼
ULTRA LITHIUM INC	ULI	CANADA	CAD	7.67	0.08	0.07	▲
<b>CONSUMERS</b>							
BASF SE	BAS	GERMANY	EUR	55,730.00	60.63	63.87	▼
BEIJING EASPRING MATERIAL TECHNOLOGY CO., LTD.	300073	CHINA	RMB	10,490.00	24.01	22.97	▲
JOHNSON MATTHEY PLC	JMAT	UK	GBP	6,250.00	3,228.00	3,329.00	▼
LG CHEM LTD	051910	S. KOREA	KRW	23,820,000.00	337,500.00	354,500	▼
NIPPON CHEMICAL INDUSTRIAL CO	4092	JAPAN	JPY	18,930.00	2,122.00	2,068.00	▲
PANASONIC CORP	6752	JAPAN	JPY	2,270,000.00	925.00	898	▲
SAMSUNG SDI CO LTD	006400	S. KOREA	KRW	17,120,000.00	249,000.00	236,500	▲
UMICORE SA	UMI	BRUSSELS	EUR	7,010.00	28.54	28.20	▲

Source: Bloomberg \*Share prices recorded as of market close on final day of the month