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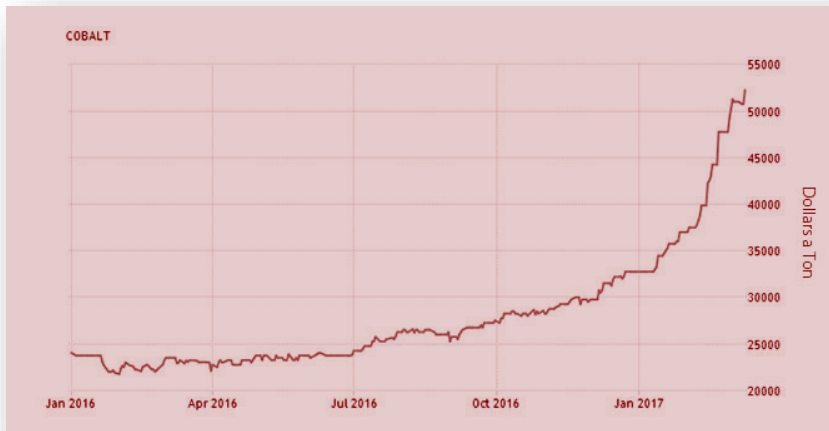
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The UPM Market Informer

Monthly Intelligence for Customers of United Performance Metals

Cobalt—Why Lithium-ion Battery Prices Increase

The cobalt market was in chaos in the past months. With the chaos would undoubtedly come higher prices. Cobalt price has increased nearly 100 percent in the whole market since October, 2016, and will continue to rise to a six year high. As the main material of lithium-ion batteries, cobalt price rising can absolutely result in mobile phone batteries price booming. The graph below highlights the increase in cobalt price over the past year, especially in late 2016 and early 2017. Let’s find out the reason why cobalt price is increasing.



1. China is the largest battery producer in the world, and it has high demand in cobalt but is short in supply. In short, the problem China is facing now is that cobalt supply cannot keep up with corresponding demand for batteries in mobiles, electric vehicles and household appliances. That makes it heavily dependent on the Democratic Republic of Congo for cobalt. The supply panic caused by political crisis of the Republic of Congo makes cobalt production fall, contributing to the rising of price for cobalt. That is one of the reasons.

2. Hybrid electric vehicle batteries demand is also a driver of cobalt prices. China is going to

open up the new energy vehicle market. This fast-growing industry will need a huge amount of cobalt to pull off. It is estimated that the number of cobalt used in electric vehicle batteries will increase from less than 2000 tons in 2015 to 17000 tons in 2020. That will also run up the price for cobalt.

3. With consumer electronics coming into the peak season, the strong demand for mobile batteries and electric vehicle batteries has also intensified a higher price of cobalt. As cobalt is scarce and its price is increasing, an imminent spike in demand for cobalt will be challenging in the future.

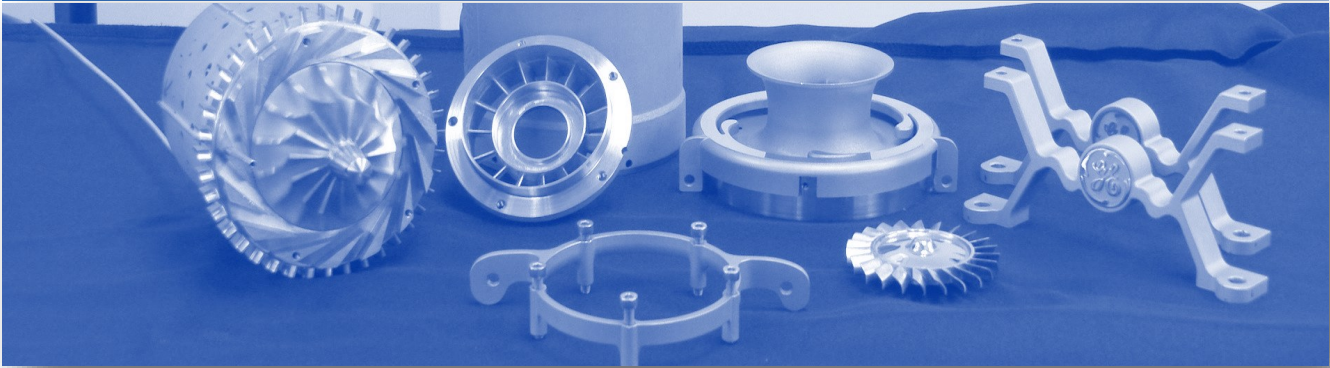
4. Some suppliers may start hoarding global cobalt supplies, which will give rise to another phase of cobalt supply panic.

As a key ingredient of lithium-ion batteries, there is no doubt that cobalt price increasing would make battery cost become more expensive. Maybe now is a good time to build some battery stocks to go through these risks.

Source: REWA Technology March 13, 2017



This Tiny 3-D Printed Jet Engine Could Have Big Promise



Call it the little engine that could. Last year, a team of engineers at GE Aviation's Additive Technology Center built an almost entirely 3D printed miniature jet engine — a backpack-size powerhouse that hits 33,000 rotations per minute. While this little guy — it measures 1 foot, 8 inches — isn't going to propel a commercial airliner anytime soon, it did demonstrate that a powerful, functioning engine built mainly from 3D printed parts isn't a flight of fancy so much as the future of flight.

Additive manufacturing is hardly new to aviation. Parts of full-size aircrafts already incorporate 3D printed parts. CFM's LEAP engine — a best-seller since it entered into service last year — has 3D printed fuel nozzles. In April, Reuters reported that Boeing would start using 3D printed parts for structural components of its 787 Dreamliner. Though petite, GE's mini engine could have big implications. It represents the promise that one day, you could be sitting on a plane, and the engine keeping you in the sky will have been entirely 3D printed.

Coolness factor aside, 3D printed jet engines are considerably lighter, and reducing the weight of an aircraft has the knock-on effect of reducing the amount of fuel needed to keep a plane in the sky — and less fuel means a more cost-effective flight, and less emissions. Boeing estimates that by incorporating additive manufacturing in the production of up to 1,000 Dreamliners, the company could potentially reduce costs by up to \$3 million per plane. Imagine the savings if the technology were rolled out on a greater scale.

Using 3D printing to manufacture parts also means less material waste, which further reduces the cost and complexity of production. For example, the process GE used to print its mini engine — direct metal laser melting, or DMLM — involves melting metal powder layer upon layer and building a part from the ground up, rather than cutting it from one large piece of material.

Additive manufacturing also means a quicker, more custom design. GE says that 3D printing fuel nozzles for the LEAP engine allowed engineers to reduce the number of brazes and welds in the design from 25 to just five. "You get speed because there's less need for tooling and you go right from a model or idea to making a part," says Matt Benvie, a spokesman for GE Aviation. "You can also get geometries that just can't be made any other way."

There are still limits to what 3D printing can achieve, of course. The new technology is not yet as fast nor as cheap as hoped; it took GE years to build a small, simple prototype. The materials needed for 3D printing can sometimes be too expensive for mass production. And we're not yet in a place where 3D printed parts are coming out perfect — post-processing work is often required.

Still, for aircraft manufacturers, the benefits of eventually 3D printing most, if not all, aircraft parts are too great not to pursue. Airbus has gone so far as to say the technology could reduce both raw material and energy used in production by 90 percent; it has also been reported that 3D printing all the possible components of an A350 would reduce the weight of the aircraft by more than a ton. For a feel of just how much fuel that would save, consider that back in 2014, Virgin Atlantic slimmed the design of its meal trays to trim 300 pounds of weight per flight — enough to save millions of dollars on fuel (not to mention reducing carbon emissions).

Even more interesting, it could be that size does matter. In December, Pune, India-based market research company ReportsnReports said miniaturizing aircraft components through 3D printing would be key to improving fuel efficiency and operating costs in years to come. Perhaps the future is all about thinking small. *Source: ZY May 16, 2017, Mike Keller*



**Surcharge Totals
March—August 2017**

Grades	Mar	Apr	May	June	July	Aug
15-5	0.4781	0.4853	0.4673	0.4524	*	*
15-7	0.5955	0.6210	0.6120	0.5774	*	*
17-4	0.4833	0.4882	0.4719	0.4582	*	*
17-7	0.5493	0.5587	0.5286	0.5031	*	*
18SR	0.3308	0.3293	0.3257	0.3257	*	*
201	0.4838	0.4881	0.4677	0.4526	*	*
301 7.0%	0.5568	0.5650	0.5355	0.5103	*	*
302/304/304L	0.5933	0.6016	0.5687	0.5403	*	*
304-8.5%	0.6087	0.6178	0.5759	0.5529	*	*
305	0.7244	0.7378	0.6902	0.6476	*	*
309	0.7762	0.7841	0.7366	0.6940	*	*
310	1.0223	1.0369	0.9640	0.8965	*	*
316/316L	0.7335	0.7608	0.7390	0.6921	*	*
316LS/316LVM	0.9200	0.9100	0.8900	*	*	*
317L	0.8478	0.8799	0.8639	0.8075	*	*
321	0.6092	0.6205	0.5839	0.5520	*	*
347	0.8768	0.8880	0.8514	0.8195	*	*
409/409 Mod	0.2384	0.2467	0.2428	0.2428	*	*
410/410S	0.2497	0.2569	0.2530	0.2530	*	*
430	0.3162	0.3164	0.3127	0.3127	*	*
434	0.3567	0.3617	0.3649	0.3606	*	*
439	0.3307	0.3292	0.3256	0.3256	*	*
440A	0.3162	0.3164	0.3127	0.3127	*	*
2205	0.7352	0.7523	0.7574	0.7215	*	*
263	3.6196	3.8044	3.9435	5.0868	6.4771	6.5417
276	3.4967	3.5832	3.3826	3.6396	3.6576	3.5368
A286	0.9927	1.0824	0.9675	1.0519	1.0079	0.9355
330	1.2808	1.3848	1.2000	1.3174	1.2315	1.1241
400	2.3223	2.3123	1.9708	2.2196	2.0685	1.8568
455	0.5600	0.5500	0.5100	*	*	*
465	0.6400	0.6300	0.6100	*	*	*
600	2.5506	2.6038	2.2021	2.4507	2.2798	2.0593
601	2.2362	2.3541	2.0264	2.2298	2.0773	1.8962
617	2.8741	3.0035	2.9397	3.6710	5.0783	5.0335
625	4.2190	4.3440	4.0843	4.3166	4.2492	4.1002
718	4.2763	4.3855	4.1335	4.3175	4.2214	4.0784
X-750	3.0994	3.1598	2.7694	3.0110	2.8433	2.6288
800H/HT	1.1969	1.3259	1.1673	1.2689	1.1894	1.0955
825	1.6958	1.8221	1.6401	1.7838	1.7143	1.6064
HX	2.3046	2.4337	2.2540	2.4689	2.4709	2.3634
188	8.1500	10.6000	11.3900	*	*	*
CCM	12.1100	18.7200	20.1300	*	*	*
L-605	9.8000	13.0300	14.0900	*	*	*

*Surcharge currently not available

US Industrial Production Rose 1.0% in April vs. 0.4% Increase Expected

American industry expanded production last month at the fastest pace in more than three years as manufacturers and mines recovered from a March downturn.

The Federal Reserve said Tuesday that U.S. industrial production at factories, mines and utilities shot up 1 percent in April from March, the biggest gain since February 2014. Factory production rose 1 percent after declining 0.4 percent in March. Mine production increased 1.2 percent after falling 0.4 percent in March. And utility output rose 0.7 percent after surging 8.2 percent in March.

Factory production has risen three of four months this year. Manufacturing has recovered from a rough patch in late 2015 and early 2016 caused by cutbacks in the energy industry and a strong dollar, which makes U.S. goods costlier in foreign markets.

Source: CNBC May 16, 2017

U.S. Industrial Production



UPM Unveils New Trade Show Booth

United Performance Metals (UPM) unveiled a new trade show booth at this year's EASTEC show in West Springfield, MA. The 10 x 10 booth features dramatic LED backlighting and includes two iPad stands which display a new video featuring UPM's FIRSTCUT+® Processing Services.

The dynamic booth design showcases an expanded line of high performance metal products and processing services now offered as a result of the company's recent integration with three other O'Neal Industries affiliate companies in January, 2017.

"It's exciting to see the all of products and services come together visually within the new design. The backlit panels really pop and make UPM stand out among the rest," said Jeff Adams, Marketing Manager for United Performance Metals. The booth will be displayed next at OMTEC in Chicago, IL mid-June. Be sure to look for us in Booth #431.



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www.upmet.com/resources/market-informer/archive.

For questions or to place an order, contact sales@upmet.com or call us at 888.282.3292.