



Weekly Precious Metals News Articles: November 26, 2021

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Below is a cross section of relevant news article to the world of Precious Metals:

Markets, Supply & Demand, Investment, and Industrial Applications.

Printable PDF version attached. Enjoy-

Gold

- **Gold halts 4-session price slide as U.S. investors turn to Thanksgiving**
 - Gold prices ended slightly higher Wednesday, snapping a four-session decline, despite a rise in the U.S. dollar and a batch of mostly upbeat U.S. economic reports.
<https://www.marketwatch.com/story/gold-set-for-longest-string-of-losses-since-early-march-as-investors-limp-into-holiday-11637764334?siteid=msnheadlines>
- **Gold jewelry market in the US beats expectations in 2021, hitting a 12-year high**
 - Some see the return of overseas holidays and family trips to the theatre, and higher inflation as meaning a quieter year. However, others think high savings, a fuller emergence from the pandemic and an ongoing love of gold jewelry as sufficient to mean another bumper year," Metals Focus concluded.
<https://www.kitco.com/news/2021-11-19/Gold-jewelry-market-in-the-US-beats-expectations-in-2021-hitting-a-12-year-high.html>
- **Alaska's largest-ever gold nugget up for sale**
 - A rare and massive gold nugget, weighing around 20lbs (9kg), has been put up for sale 23 years after it was discovered and it's expected to reach at least \$1 million at auction that takes place on Dec. 8.
<https://www.mining.com/alaskas-largest-ever-gold-nugget-the-size-of-a-babys-head-up-for-sale/>
- **Gold hastens slide as dollar jumps after Fed chair Powell's renomination**
 - Gold retreated nearly 2% on Monday as the dollar jumped after Federal Reserve Chair Jerome Powell was nominated for a second term, driving expectations that the central bank may stay the course on tapering economic support.
<https://finance.yahoo.com/news/gold-hastens-slide-dollar-jumps-171015425.html>

Semiconductor Related Articles (impacting Precious Metals electronics):

- **Taiwan Semiconductor: The Semiconductor Shortage Is Likely To Become A Glut Next Year**
 - Initial evidence suggests the chip shortage is ending as lead times are hardly rising and TSMC's sales declined dramatically in October.
 - Taiwan Semiconductor's sales may decline after the holidays due to the coming absence of new products and longer lifespans for smartphones, computers, and vehicles.
 - Surging capital expenditures and semiconductor investments in China are likely to cause a surge in new semiconductor production in 2022-2023 as demand slows.

- Falling real incomes and decade-low U.S. consumer confidence may result in lower demand for electronic products next year.
<https://seekingalpha.com/article/4469709-taiwan-semiconductor-stock-semiconductor-shortage-likely-glut-next-year>
- **China Accelerates Foundry, Power Semi Efforts**
 - Massive expansion campaign targets wide variety of chips, but export controls limit growth at leading edge.
<https://semiengineering.com/china-accelerates-foundry-power-semi-efforts/>
- **These smart glasses offer a glimpse at the future Apple and Facebook are planning**
 - Start-up Avegant has built an LED light engine that could enable device manufacturers to build small, stylish augmented reality smart glasses.
 - I demoed Avegant's light engine in October and was blown away by the crystal clarity of the AR visuals created by the component.
 - Microsoft's \$3,500 HoloLens and the \$2,295 Magic Leap 1 are the most advanced but they're bulky and more akin to goggles.
 - Amazon offers the \$249.99 Echo Frames, but they just let you talk to Alexa and you don't see any augmented reality visuals through the lenses.
 - Facebook's \$299 Ray-Ban Stories glasses can be used to take photos and videos but little else. The latest version of Snap's Spectacles offers some AR visuals, but it isn't fashionable and is only available to social media creators.
 - Google repurposed its \$999 Glass device for enterprise customers after it was dismissed by the public due to privacy concerns.
 - Apple is also reportedly working on its own glasses, but it's still unclear when they'll be unveiled let alone released to the public.
<https://www.cnbc.com/amp/2021/11/20/these-smart-glasses-offer-a-glimpse-at-the-future-apple-and-facebook-are-planning.html>
- **Samsung Picks Texas for \$17B Semiconductor Plant**
 - Samsung chose the 5 million-sq-m site in Taylor for the facility because its proximity to an existing Samsung plant in Austin will allow the two sites to share resources, and also because of factors such as local infrastructure stability, community development opportunities and government support. Texas officials say they offered Samsung a \$27 million project grant to create jobs, which is expected to include 2,000 tech jobs.
<https://www.enr.com/articles/53110-samsung-picks-texas-for-17b-semiconductor-plant>
- **Does the FPGA Industry Face Peril?**
 - Semiconductor device makers have not taken action to qualify additional subcontractors to perform column attachment services, a critical process in defense grade FPGA fabrication. The U.S. Department of Defense (DOD) provides guidelines that help identify and mitigate dependency on services provide by single-source subcontractors. Document SD-22 titled, "Diminishing Manufacturing Sources and Material Shortages, a Guidebook of Best Practices for Implementing a Robust DMSMS Management Program." provides resources to aid FPGA makers who may be striving to broaden their supplier base for components that are critical to the welfare of National Security. Semiconductor device makers, including Microchip and Xilinx have not taken action to qualify additional subcontractors to perform column attachment services, a critical to National Security.
<https://www.topline.tv/MEPTC7.html>

Silver

- **Silver - The Forgotten Precious Metal – ShareCafe**

- Silver is the poor man's precious metal, overshadowed by the shinier gold and being left behind by the platinum and palladium as their growing industrial use has seen demand outstrip supply and prompt price booms.
- Both platinum and palladium do face uncertain futures as electric vehicles of all types replace internal combustion engine (ICVs) vehicles where they are used extensively in exhaust systems as catalysts in both ICE and hybrids which should ensure solid demand for the next decade.
- Both thoughts will find greater demand when the hydrogen revolution moves from thought bubbles to actual production, consumption and demand.
- What, then, is the outlook for silver, a metal that has been forgotten for several years, judging by global demand estimates.
<https://www.sharecafe.com.au/2021/11/25/silver-the-forgotten-precious-metal/>
- **Silver Price Forecast: XAG/USD plummets almost 2%, amid a risk-off market mood**
 - Silver (XAG/USD) extends its overnight session losses, plunges 1.91% in the day, trading at \$23.14 during the New York session at the time of writing. The discovery of a new COVID-19 variant called NU in South Africa dented the market sentiment.
<https://www.fxstreet.com/news/silver-price-forecast-xag-usd-plummets-almost-2-amid-a-risk-off-market-mood-202111261758>
- **Mapping The Rise Of Solar Energy**
 - Solar power led the renewable energy push in 2021, with 127 gigawatts installed in 2020
 - China is the undisputed leader in solar installations, with over 35% of global capacity
 - Although Australia hosts a fraction of China's solar capacity, it tops the per capita rankings
<https://oilprice.com/Alternative-Energy/Solar-Energy/Mapping-The-Rise-Of-Solar-Energy.html>
- **Global solar installations to grow 20% in 2022**
 - Global solar photovoltaic (PV) installations will see over 20% growth in 2022 and surpass the 200GW (DC) barrier for the first time, at a total investment of at least \$170bn, according to a new report.
 - IHS Markit's study predicts solar PV installations to experience double-digit growth in 2021.
 - Continued growth through 2022 would mark the second year in a row to experience double-digit growth of global installations in a high-price environment, the report highlighted.
 - Matt: IHS forecasting > 160 GW on 2021 and > 200 GW new installations in 2022. That's 136Moz and 156Moz of demand respectively, or 14% of the supply growing to 16% of the silver supply.
<https://renews.biz/73660/global-solar-installations-to-grow-20-in-2022/>

Precious Metals Mining:

- **(Sibanye-Stillwater CEO Neal) Froneman tells world of Sibanye's confidence in hydrogen economy**
 - Speaking at SFA Oxford's green metals and hydrogen presentation covered by Mining Weekly, Froneman emphasised that the Johannesburg- and New York-listed Sibanye was going all out to fully understand the implications of:
 - platinum performing its effective catalyst role in proton electrode membrane (PEM) electrolyzers and PEM fuel cells;
 - iridium enabling the production of green hydrogen through electrolyzers; and
 - ruthenium twinning with platinum, also in PEM fuel cells.
 - The unmatched chemical and physical properties of PGMs make them extremely difficult to substitute, a slide projected on to screens emphasised.
<https://www.engineeringnews.co.za/article/froneman-tells-world-sibanye-has-significant-confidence-hydrogen-economy-2021-11-26>
- **South African miners plan \$3.8 billion of power projects**
 - South African mining companies could spend 60 billion rand (\$3.8 billion) on renewable energy projects, helping to ease the country's electricity supply crisis.

- The industry is planning 3,900 megawatts of solar, wind and battery energy projects, which could supplement supplies from state-owned utility Eskom Holdings SOC Ltd., Roger Baxter, chief executive officer of Minerals Council of South Africa, said Tuesday in a statement.
<https://www.mining.com/web/south-african-miners-plan-3-8-billion-of-power-projects/>
- **Eskom Failures Leave South Africa Set for Years of Power Cuts**
 - South Africa's deepening energy crisis looks set to persist for at least two more years, with operational problems at the monolithic state power utility showing no signs of abating and plans to add new generation capacity ensnared in legal wrangling and red tape.
 - The meltdown at Eskom Holdings SOC Ltd., which supplies more than 90% of the nation's electricity, is a legacy of chronic mismanagement and rampant corruption during former President Jacob Zuma's tenure along with a failure to adequately maintain plants and invest in new ones. Andre de Ruyter, who took over as chief executive officer in January 2020, has fallen short on a pledge to ease rolling blackouts, with the rot permeating far deeper than he initially anticipated.
<https://www.bnnbloomberg.ca/eskom-failures-leave-south-africa-set-for-years-of-power-cuts-1.1686412>
- **Green activists attempt to block major gold mining project in Romania**
 - Romanian NGO Declic, a member of the Mining Watch Romania network, reportedly managed to block the gold and copper mining in Rovina developed by the Canadian company Euro Sun Mining (formerly Carpathian Gold), the largest gold and copper mining project in the European Union.
<https://www.msn.com/en-xl/europe/top-stories/green-activists-attempt-to-block-major-gold-mining-project-in-romania/ar-AAR9jsH?ocid=BingNewsSearch>

E-Waste & Precious Metals Recycle Related:

- **European consortium develops pilot line for complete (Solar) PV module recycling**
 - A European consortium consisting of Italian energy agency Enea and the French Alternative Energies and Atomic Energy Commission, among other entities, has developed a plan to build a low-emissions pilot line to recover critical and precious metals such as silicon, indium, gallium and silver. The line will be designed to reintroduce new materials and new products into the production cycle.
<https://www.pv-magazine.com/2021/11/17/european-consortium-develops-pilot-line-for-complete-pv-module-recycling/>
- **Salvaging rare earth elements from electronic waste**
 - In the process, hairy cellulose nanocrystals, nanoparticles derived from cellulose fibrils, bind selectively to neodymium ions, separating them from other ions, such as iron, calcium and sodium, according to Sheikhi. The nanoparticles are known as "hairy" due to cellulose chains attached to their two ends, which perform critical chemical functions.
 - To do this, the researchers negatively charged the hairy layers of the nanoparticles in order to attract and bind with the positively charged neodymium ions, resulting in particle aggregation into larger pieces that can then be effectively recycled and reused.
 - "The process is effective in its removal capacity, selectivity and in its speed. It can separate neodymium in seconds by selectively removing the element from some of the tested impurities."
<https://www.chemurope.com/en/news/1173676/salvaging-rare-earth-elements-from-electronic-waste.html>
- **The World Needs to Crack Battery Recycling, Fast**
 - Used in the cathode, cobalt is the most sought-after material used in batteries. In its raw form, the rare, bluish-grey metal is predominantly sourced from the Democratic Republic of Congo, where miners work in perilous conditions. The world's major electric car manufacturers are already moving away from cobalt, deterred by the human rights abuses, shortages in the supply chain, and fluctuating prices.
 - That raises the question of whether recyclers will still find it worthwhile to dismantle newer battery types lacking the most valuable ingredients. "When you move to more sustainable materials, and

lower cost materials, the incentive to recycle and recover them diminishes,” says Jenny Baker, an energy storage expert at Swansea University. She likens this to a dilemma in consumer electronics: It is often cheaper to buy a new mobile phone than to get it fixed or recycled.

<https://www.wired.co.uk/article/ev-battery-recycling-cobalt>

- **New research shows boon in end-of-life lithium-ion batteries**
 - According to Lux, by the end of 2020, 17.6 gigawatt-hours of lithium-ion batteries had reached end of life. By 2035, this figure will balloon to more than 140 gigawatt-hours. The company says, historically, battery recycling efforts offered low recovery rates for cathode active materials while consuming unsustainable amounts of energy and chemicals.
<https://www.recyclingtoday.com/article/lux-research-sees-boon-in-lithium-ion-battery-end-markets/>
- **American Battery Technology begins second phase of lithium-ion battery recycling plant**
 - American Battery Technology Co. a critical minerals and lithium-ion battery recycling company based in Reno, Nevada, will begin the second phase of construction on its \$30 million lithium-ion battery recycling facility later this month. The second phase will encompass the infrastructure and shell of the precommercial battery recycling plant in Fernley, Nevada.
<https://www.recyclingtoday.com/article/american-battery-technology-begins-second-phase-lithium-ion-facility-construction/>

Platinum

- **Very strong platinum imports into China – WPIC**
 - Many things could play out next year that have the potential to materially reduce the substantial platinum surplus that the World Platinum Investment Council (WPIC) is forecasting for next year, Mining Weekly can today report.
 - Among these is the very strong current importation of platinum into China, which is described as being significantly above identified demand.
<https://www.miningweekly.com/article/very-strong-platinum-imports-into-china-wpic-2021-11-23>
- **Platinum market heading for biggest surplus in years, WPIC says**
 - The World Platinum Investment Council said on Wednesday the global platinum market would see a much larger surplus this year than it previously forecast and another big oversupply in 2022.
 - Platinum is used by automakers to neutralise harmful engine emissions and by jewellers, industries such as glassmakers and for investment. Surpluses imply lower prices and deficits higher prices.
<https://www.reuters.com/markets/us/platinum-market-heading-biggest-surplus-years-wpic-says-2021-11-24/>
- **Platinum Quarterly Q3 2021**
 - 30-page report from the WPIC/Metals Focus
 - For 2021 total platinum supply is now forecast to rise 19% year-on-year to 8,114 koz, still below the 2019 level despite the inclusion of the 380 koz contribution from the ACP inventory unwind. Demand is expected to fall 5% year-on-year, as significant outflows from ETFs and stocks held by exchanges exceed the collective year-on-year growth in automotive, jewellery and industrial demand. Consequently, our forecast surplus for 2021 has increased from 190 koz to 769 koz. Notably a 14% (+340 koz) growth in platinum automotive demand is anticipated despite the global semiconductor shortage limiting automotive production.
https://platinuminvestment.com/files/832946/WPIC_Platinum_Quarterly_Q3_2021.pdf
 - 33-page presentation from the WPIC/Metals Focus
[WPIC Platinum Quarterly Q3 2021 \(platinuminvestment.com\)](https://platinuminvestment.com/files/832946/WPIC_Platinum_Quarterly_Q3_2021.pdf)

Fuel Cells/Hydrogen Economy Related Articles:

- **Johnson Matthey plots £50m hydrogen gigafactory**
 - Engineering group Johnson Matthey is planning a £50 million hydrogen fuel cell gigafactory that would build components for a new generation of vehicles.

- The FTSE 100 maker of catalytic converters has won £12 million in funding from the Department for Business, Energy and Industrial Strategy to put towards development of the factory, which is likely to be built within its existing site at Royston, Hertfordshire.
<https://www.thetimes.co.uk/article/johnson-matthey-plots-50m-hydrogen-gigafactory-0x0cngwhf>
- **Doosan to develop hydrogen power pack for cars**
 - Doosan Group said Sunday it will develop a hydrogen power pack for commercial vehicles, signaling its entry into the hydrogen bus and truck markets.
 - “We will develop a hydrogen power pack for land vehicles. We are also reviewing a total charging solution at bus depots that can charge both hydrogen and electric buses,” an executive at Doosan Fuel Cell, a hydrogen business unit of Doosan, told The Korea Herald while declining to be named.
<http://www.koreaherald.com/view.php?ud=20211121000167>
- **170 zero emission heavy duty fuel cell vehicles powered by REFIRE and Johnson Matthey technology hit China’s roads**
 - In the last six months, 170 new heavy duty fuel cell electric vehicles (FCEV) hit
 - China’s roads powered by REFIRE and Johnson Matthey technology
 - Johnson Matthey and REFIRE’s ongoing partnership will produce enough fuel cell systems to power up to 280 heavy duty FCEVs
 - The rise of the delivery-based society and the supply chains that support it, highlights the case for sustainable, zero emission commercial transportation
 - China leads the world in the number of commercial FCEVs on its roads
<https://drudgereport.com/>
- **More than \$2 trillion investment needed to meet IEA hydrogen targets**
 - More than \$2 trillion of investment would be required in equipment and infrastructure to sustain the accelerating global momentum towards establishing hydrogen as a competitive element of a net-zero carbon emissions economy by 2050, the Green Metals and Hydrogen symposium heard on Friday.
 - The year 2030 is viewed by key industry participants as a critical time when hydrogen-based technologies will become competitive with conventional technologies.
<https://www.mining.com/more-than-2-trillion-investment-needed-to-meet-ia-hydrogen-targets/>
- **Bloom Energy (SOFC) demonstrates (green) hydrogen fuel production - H2 News**
 - Two companies, Bloom Energy and Heliogen, have announced that they have successfully used concentrated solar power (CSP) for green hydrogen fuel production at a recent demonstration that took place in California. Heliogen was the supplier of the CSP technology that was used for powering the demonstration.
 - Bloom energy used its electrolyzer powered by Heliogen’s CSP (concentrated solar power) technology for the green hydrogen fuel production. According to Heliogen, its artificial intelligence (AI) powered CSP technology is capable of producing electricity for longer spans of time than traditional solar photovoltaic (PV) technology. By storing the solar energy, it can operate for just about 24 hours per day and seven days per week.
<https://www.hydrogenfuelnews.com/hydrogen-fuel-production-csp/8549517/>
- **Hydrogen - Caterpillar to Launch Demonstration Project Using Hydrogen Fuel Cell Technology - Renewable Energy Magazine, at the heart of clean energy journalism**
 - Caterpillar Inc. has launched a three-year project through a collaboration with Microsoft and Ballard Power Systems to demonstrate a power system incorporating a large-format hydrogen fuel cell to produce reliable and sustainable backup power for data centers. The project is supported and partially funded by the U.S. Department of Energy (DOE) under the H2@Scale initiative and backed by the National Renewable Energy Lab (NREL).

<https://www.renewableenergymagazine.com/hydrogen/caterpillar-to-launch-demonstration-project-using-hydrogen-20211122>

- **Giant green hydrogen project powered by 6 GW of off-grid solar and wind proposed for South Australia**
 - Kallis Energy Investments, led by South Australian-based Terry Kallis, is proposing to develop an enormous 6 GW project in the state's north. The Moolawatana Renewable Hydrogen Project, as it's called, could potentially see a combined solar and wind farm, each with up to 3 GW of capacity, being used to power electrolyzers producing renewable, green hydrogen. <https://www.pv-magazine.com/2021/11/22/giant-green-hydrogen-project-powered-by-6-gw-of-off-grid-solar-and-wind-proposed-for-south-australia/>
- **The Hydrogen Stream: A fuel cell gigafactory in the US and new plans from Australia**
 - U.S. hydrogen solutions company Plug Power opened, this week, its green hydrogen and fuel cell gigafactory in New York state. In Australia, Patriot Energy announced a supply agreement for 75 modular green hydrogen generation units, and ARENA said it will play a key role in the development and delivery of the German-Australian Hydrogen Innovation and Technology Incubator. <https://www.pv-magazine.com/2021/11/23/the-hydrogen-stream-a-fuel-cell-gigafactory-in-the-us-and-new-plans-from-australia/>
- **Key Messages from the IEA Global Hydrogen Review**
 - The IEA launched the Global Hydrogen Review (GHR). The first key message is that the unprecedented momentum for clean hydrogen is turning into action. The amount of announced clean hydrogen projects is increasing quickly. The GHR estimates that the current pipeline of projects may result in 17 million metric tons (Mt) of low-carbon hydrogen, 8 Mt from electrolysis and 9 Mt from fossil fuels with CCUS (Carbon Capture, Utilization, and Storage) in 2030. <https://robbreport.com/motors/aviation/hypoint-first-hydrogen-powered-helicopter-1234633156/?>
- **Several Rotterdam terminals to be ready for hydrogen imports by 2025**
 - In the port of Rotterdam, the first companies are busily preparing for the storage, processing and transit of hydrogen: a promising energy carrier that will allow companies to make the transition to climate neutrality. <https://www.portofrotterdam.com/en/news-and-press-releases/several-rotterdam-terminals-to-be-ready-for-hydrogen-imports-by-2025>
- **Toyota and DRIVR put 100 hydrogen taxis on the roads in Copenhagen**
 - Toyota and the taxi service DRIVR have put more than 100 hydrogen (Toyota Mirai) taxis on the roads in Copenhagen, supporting the political goals for a greener taxi industry. The Danish government's aim is that no new taxis emit CO2 or air pollution from 2025 and by 2030 all moving taxis must be zero-emission cars. <https://www.greencarcongress.com/2021/11/20211119-drivr.html>

Palladium

- **Palladium Price Analysis: XPD/USD looks vulnerable, support at \$1,850 is exposed – Commerzbank**
 - Emphatic failure at the \$2,208 October high has increased the downside risk for palladium. Karen Jones, Team Head FICC Technical Analysis Research at Commerzbank, is closely watching the \$1,850 level as a break below here would open up the long-term Fibonaci support at \$1,737.
 - Key near-term resistance lies at \$2,208
 - "Palladium failed to close above the \$2,208 October high and this has provoked a sharp sell-off. This has again pushed the chart to a more negative bias and attention is once again on the \$1,848/50 support."

<https://www.fxstreet.com/news/palladium-price-analysis-xpd-usd-looks-vulnerable-support-at-1-850-is-exposed-commerzbank-202111241028>

- **U.S. new vehicle retail sales set to fall 13% in Nov - data**
 - U.S. retail sales of new vehicles are expected to fall in November despite strong demand as automakers grapple with chip shortages and supply chain constraints, consultants J.D. Power and LMC Automotive said on Wednesday.
 - Retail sales of new vehicles in the United States are seen dropping 12.6% to 933,700 units in November from a year earlier.
<https://www.reuters.com/markets/us/us-new-vehicle-retail-sales-set-fall-13-nov-data-2021-11-24/>
- **(China) Used light-vehicle sales lose steam amid virus resurgence**
 - China's used light-vehicle sales rose less than one percent to below 1.16 million in October after double-digit growth in the first nine months, according to the China Automobile Dealers Association.
 - The sudden market slowdown was mainly caused by lockdowns in multiple cities in northwest and northeast China, triggered by resurging coronavirus infections, the trade group said last week.
 - In October, deliveries of used crossovers and SUVs surged 25 percent to some 173,500
<https://www.autonews.com/china/china-used-light-vehicle-sales-lose-steam-amid-virus-resurgence>

PGM Minor Metals (Rhodium, Iridium, Ruthenium, Osmium)

- **UW chemistry lab discovers potential replacement to carbon based fuel economies**
 - A recent paper published Nov. 8 in "Nature Chemistry" explores a new mechanism for producing nitrogen gas from ammonia with a metal catalyst. The reaction occurs spontaneously under mild conditions, meaning it releases energy that could be captured and used, an author on the paper and professor in inorganic chemistry John Berry said.
<https://badgerherald.com/news/2021/11/17/uw-chemistry-lab-discovers-potential-replacement-to-carbon-based-fuel-economies/>
- **Chemists Discover New Way To Harness Energy From Ammonia by Replacing Carbon Fuel With Nitrogen**
 - Adding ammonia to a metal catalyst containing ruthenium created nitrogen spontaneously, implying that no additional energy was required. Instead, with protons and nitrogen gas as byproducts, this process can be used to generate energy. Furthermore, the metal complex may be recycled and reused by exposing it to oxygen, which is a far cleaner method than using carbon-based fuels.
 - "We discovered that we are not only producing nitrogen, but we are doing so under entirely unprecedented conditions," says Berry, who is the Lester McNall Professor of Chemistry and focuses his research on transition metal chemistry. "It's a fairly huge deal to be able to finish the ammonia-to-nitrogen conversion under ambient settings — and receive energy."
<https://en.brinkwire.com/science/chemists-discover-new-way-to-harness-energy-from-ammonia-by-replacing-carbon-fuel-with-nitrogen/>
- **Iridium & Platinum: Johnson Matthey to help Hystar develop next-generation electrolyzers**
 - "The Hystar cell design offers significant performance improvements for electrolyser users and JM's CCMs have a much thinner, lower resistance membrane than those typically used in today's commercial PEM systems," said Eugene McKenna, Managing Director, Green Hydrogen. In turn, Hystar's co-founder and CTO Alejandro Barnett commented that JM's CCMs "have performed extremely well under Hystar operating conditions."
<https://renewablesnow.com/news/johnson-matthey-to-help-hystar-develop-next-generation-electrolysers-761926/>
- **Passive Electronic Components: Global Market Update, August 2021**

- **Thick Film Chip Resistors:** This product category registered a solid 30-week lead time for all chips in August 2021 as supply chain issues with ruthenium continued to plague the industry, along with “short-term” shutdowns of factories in Malaysia and the Philippines.
- The price of ruthenium, the active ingredient in thick film resistor paste, increased in price sharply to \$850 per Troy ounce in May and was at \$725 an ounce in August 2021. The price is now 20 times what it has traditionally been (\$44/oz) and remains a serious problem for manufacturers of thick film chip resistors, networks and arrays.
- **Thin Film Resistors,** Markets continued to show a tightening across the board in August 2021, and in the prior months of July, June, May and April 2021, in response to tightening thick film chip markets. Thin film products, based on nickel and chrome materials, are the alternative to ruthenium thick film chips and the volatile price of ruthenium thick film materials. However, we note that thin film chips now have lead times at almost 40 weeks for 0603 and 0805 chips consumed in the computer and auto markets.
<https://www.tti.com/content/ttiinc/en/resources/marketeye/categories/passives/me-zogbi-20210906.html>
- **Ruthenium and Iridium in the Hydrogen Economy: Green Metals & Hydrogen Conference**
 - SFA Oxford, Sibanye-Stillwater, and Furuya Metals hosted a conference on these Green Metals. YouTube Video replay of the nearly 3-hour conference is attached. Includes presentation from ITM Power electrolyzer CEO as well.
<https://greenmetalsandhydrogen.com/conference/>
- **Rhodium: Catalysts: Poisoned and very much alive at the same time**
 - What is highly unusual, however, is what a research team at TU Wien has now observed when studying hydrogen oxidation on a rhodium catalyst: The surface of a rhodium foil can be highly chemically active in some surface regions, while in others, only a few micrometers away, it is completely inactive, and still in others oscillations between the active and inactive state occur. Such behavior was previously thought to be almost inconceivable.
<https://www.nanowerk.com/nanotechnology-news2/newsid=59176.php>

Clean Energy General News (New Section)

- **How the Clean Energy Revolution Is Driving a Scramble for Congo’s Mines**
 - The quest for cobalt, which is vital for electric vehicles, is caught in an international cycle of exploitation, greed and gamesmanship.
<https://www.nytimes.com/2021/11/24/climate/nyt-climate-newsletter-congo.html>
- **'Greenflation' a risk for renewable energy, but long-term viability intact**
 - Rising prices of commodities needed for renewable energy will increase the costs of setting up new green power projects, but this will be balanced by better access to funds and economies of scale, policy advisers and an investor said.
 - The rising costs, as well as supply chain problems for some of the commodities and goods needed for green projects, won't be a long-term threat to the economic viability of clean energy, they told the Reuters Global Markets Forum last week.
<https://www.msn.com/en-us/money/markets/greenflation-a-risk-for-renewable-energy-but-long-term-viability-intact/ar-AAQZb1C?ocid=BingNewsSearch>
- **BASF bundles renewable energy activities in new subsidiary BASF Renewable Energy GmbH**
 - BASF is bundling its activities in renewable energies under the umbrella of BASF Renewable Energy GmbH as of January 1, 2022. The wholly owned subsidiary’s business activities will focus on supplying the BASF Group in Europe with electricity from renewable energies, electricity trading activities in Europe and global consulting for BASF and its Group companies in the field of renewable energies.

The company is based in Ludwigshafen and will be managed by Horatio Evers, who was previously responsible for the development of renewable energies at BASF SE.

<https://www.jeccomposites.com/news/basf-bundles-renewable-energy-activities-in-new-subsiary-basf-renewable-energy-gmbh/>

BEV / LiB Battery Market News

- **Toyota , Ford, Honda Dominate Most Wanted Hybrids-Tesla & Ford are Top Electric Choices**
 - Nearly a quarter of all new-vehicle shoppers in the third quarter considered an electrified vehicle, either a full electric vehicle or a hybrid, according to the Q3 2021 Kelley Blue Book Brand Watch report. That is the highest level of interest in electrified vehicles that the report has ever measured. <https://www.autoconnectedcar.com/2021/11/toyota-ford-honda-dominate-most-wanted-hybrids-tesla-ford-are-top-electric-choices/>
- **The Nickel Pickle – will ESG issues rain on indonesia's nickel parade?**
 - The Nickel Pickle: Indonesia's fast growing nickel mining and processing industry will be a major source of battery materials for the global EV market. The webinar will discuss an uneasy paradox: there are key ESG issues with an industry that supplies materials for increasingly environmentally concerned EV manufacturers and customers.
 - The speakers will discuss the following key topics:
 - Carbon footprint, outline of the carbon intensity of Ni produced from different source types
 - Air emissions – coal-fired power, acid gases – pros and cons for both laterite and sulphide
 - Impact on water– erosion and effluents, hexavalent chromium
 - Biodiversity impact – land clearing and coral reefs
 - What needs to be done to resolve these issues

<https://youtu.be/aOzXyRiQVJE>
- **A Power Struggle Over Cobalt Rattles the Clean Energy Revolution**
 - The quest for Congo's cobalt, which is vital for electric vehicles and the worldwide push against climate change, is caught in an international cycle of exploitation, greed and gamesmanship.
 - Kisanfu is a new cobalt and copper mine being built by a Chinese conglomerate in the Democratic Republic of Congo. Credit...
 - At 73, Kyahile Mangi has lived here long enough to predict the path ahead. Once the blasting starts, the walls of mud-brick homes will crack. Chemicals will seep into the river where women do laundry and dishes while worrying about hippo attacks. Soon a manager from the mine will announce that everyone needs to be relocated.
 - "We know our ground is rich," said Mr. Mangi, a village chief who also knows residents will share little of the mine's wealth. <https://www.nytimes.com/2021/11/20/world/china-congo-cobalt.html>
- **New material improves li-ion battery charging speed by 10 times**
 - Researchers at the University of Twente in the Netherlands discovered that by using nickel niobate for the anode of lithium-ion batteries, the charging speed can be improved by ten times. <https://www.mining.com/new-material-improves-li-ion-battery-charging-speed-by-10-times/>
- **Industrial Metals Rise As China's Property Market Bounces Back**
 - On Thursday, Nickel paced gains by most industrial metals on the London Metal Exchange, rising 2.5%. As shown below, spot prices for Nickel are moving higher as inventories continue to shrink, pointing to mounting supply tightness. <https://oilprice.com/Latest-Energy-News/World-News/Industrial-Metals-Rise-As-Chinas-Property-Market-Bounces-Back.html>
- **Toyota not ready to concede on its nickel-metal hydride technology**

- Ever-resourceful Toyota has found a new way to squeeze more life from tried-and-true nickel-metal hydride battery technology, giving hybrid vehicles a new lease on life.
<https://www.autonews.com/technology/toyota-not-ready-concede-its-nickel-metal-hydride-technology>
- **After shaking up nickel, China's Tsingshan sets sights on lithium**
 - Tsingshan Holding Group, the Chinese firm that shook the nickel world by rapidly boosting output in Indonesia, is among the latest entrants to the white-hot lithium sector, potentially making it a one-stop shop for electric vehicle (EV) battery ingredients.
<https://www.nasdaq.com/articles/focus-after-shaking-up-nickel-chinas-tsingshan-sets-sights-on-lithium>
- **Cobalt prices supported in 2021, expected to fall in 2022 — report**
 - S&P Global Market Intelligence November Commodity Briefing states that cobalt metal prices are expected to remain supported for the remainder of 2021 as logistical pressures persist.
 - Yu, however, expects prices to fall 8.3% in 2022 on supply growth and the easing of most supply chain bottlenecks. Total cobalt supply is forecast to total 196,000 mt in 2022, up from 136,000 mt in 2020 and an estimated 164,000 mt in 2021
<https://www.mining.com/cobalt-prices-supported-in-2021-expected-to-fall-in-2022-report/>
- **Soaring lithium prices spur changes in supply contracts**
 - Lithium consumers in the electric vehicle battery supply chain are seeking longer-term contracts with producers to secure supplies for as long as possible in a market where shortages have propelled prices to their highest in three years.
<https://www.nasdaq.com/articles/soaring-lithium-prices-spur-changes-in-supply-contracts>

Regards –