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Thu, 08 July 2021

India needs hi-tech gadgets to counter drone attacks

*The Jammu attack is a watershed in asymmetric warfare and underlines
the need for capabilities to deter, detect and neutralise such threats*

By PK Vasudeva

Two drones allegedly from across the border dropping IEDs on the Indian Air Force's technical airport in Jammu is worrisome. Two other drones were spotted over Kaluchak and Ratnuchak military stations in Jammu in the night of June 27. An alert has been sounded at all military stations to thwart such attacks. Counter-measures, including snipers and jammers, are already in place at the forward bases.

Pakistan-backed terrorist groups and the Inter-Services Intelligence have been using drones to smuggle arms, ammunition and drugs across the border into J&K and Punjab, but never have drones been used before for attacking a military base.

Counter-drone technology will have to be deployed to tackle this threat and to make sure we are able to detect drone presence in time. Use of drone technology by non-state actors represents a major jump in the way insurgency is playing out. The attack is a watershed in asymmetric warfare and underlines the need for armed forces to build capabilities to deter, detect and neutralise such aerial threats.

Drones represent three kinds of risk: privacy risk (illegal surveillance), penetration risk (drones are used to gather intelligence), and security risk (to attack installations, smuggle contraband). In Syria, ISIS has been using drones to drop payloads from the sky and so is the Taliban in Afghanistan. Drone detection can be RF-based or by conventional radars or electro-optic payloads that uses thermal imaging. Once identified, you can launch a kinetic energy weapon against the drone or jam it or confuse it by jamming its GPS. Israel's Iron Dome and other missile systems act within seconds. Detection and action will happen at a very fast pace but it will take some time to gain that kind of capability.

An official blueprint prepared by central agencies states that unregulated drones, UAVs and remotely-piloted aircraft systems are a "potential threat" to vital installations and sensitive locations and a "compatible solution" is required to counter them.

Chief of defence staff General Bipin Rawat on June 28 said that the three services, the Defence Research Development Organisation (DRDO), academia and other stakeholders were working together to develop technology to counter the threat from drones at the earliest.

He said DRDO has already achieved some success and even demonstrated its anti-drone technology. It has developed the ability to disable or shoot down hostile drones. Its anti-drone system has a range of two to three kilometres with radar capability to pick up the drone and then



use frequencies to jam the unmanned aerial vehicle. A top government official said DRDO has transferred the technology for the production of its anti-drone system to Bharat Electronics Limited (BEL). “DRDO has written to the three services and informed them that the anti-drone system is available,” he said.

India has an estimated over six lakh rogue or unregulated unmanned aerial vehicles (UAVs) and security agencies are analysing modern anti-drone weapons like ‘sky fence’ and ‘drone gun’ to counter terror or similar sabotage bids by these aerial platforms.

A drone gun is capable of jamming the radio, global positioning system (GPS) and mobile signal between the drone and the pilot, and forces the drone to the ground before it can cause any damage. This Australia-designed weapon has an effective range of two kilometres. Another solution to block a lethal drone is the sky fence system that uses a range of signal disruptors to jam the flight path and prevent them from entering their target location.

A Bengaluru-based private company, BEMIL, and Electronics Corporation of India Ltd (ECIL) among others showcased the latest technology available in this domain to the participants of a national conference attended by representatives of the Indian Air Force, the Central Industrial Security Force, Directorate General of Civil Aviation, and Airports Authority of India among others. A drone gun and sky fence looks feasible solutions and are being recommended to the government for consideration, a senior official in the security establishment said.

The Advanced Test High Energy Asset (ATHENA), is another weapon under analysis. It works by firing a high-energy laser beam on a rogue drone resulting in its complete destruction in the air. However, this is a very costly technology and is being currently tested by the US army, officials said. A ‘skywall 100’, is the ground version of the ‘drone catcher’ and it works by bringing down an UAV using a parachute that is hurled through a net from 100 meters distance.’

(The writer is Retired Senior Professor, International Trade and Member, Vivekananda International Foundation, New Delhi. The views expressed are personal.)

<https://www.dailypioneer.com/2021/columnists/india-needs-hi-tech-gadgets-to-counter-drone-attacks.html>



Thu, 08 July 2021

The killer drones are here. Get ready

The next generation of drones has enormous destructive potential. India must be prepared and not be complacent

By Vivek Wadhwa

In the *Terminator* movies, a relentless super-robot tracked and attempted to kill human targets.

A few decades later, killer robots are openly sold and deployed in the field of battle. These killer robots — flying drones — are cheaper and probably a lot less discriminating than the movie models. The Chinese-made drones that Pakistani terrorists used to attack the Indian Air Force station in Jammu were destructive enough, but a newer generation of drones poses a greater threat. The Turkish-made Kargu-2 model of killer drone can allegedly autonomously track and kill specific targets on the basis of facial recognition and Artificial Intelligence (AI). A United Nations report claims that that model has been used to mount autonomous attacks on human targets. These drones



Asymmetrical warfare disproportionately benefits the forces of chaos rather than the forces of liberty. We require a global moratorium on killer robots, including unmanned aerial vehicles. But it won't happen (Shutterstock)

hunted down retreating military convoys and

attacked them indiscriminately, without requiring data connectivity between the operator and the munitions, a true “fire, forget and find” capability.

The arrival and rapid proliferation of killer drones is no surprise. For decades, consumer technology has been outpacing military adoption of advanced technologies. Because a drone is essentially a smartphone with rotors attached, today’s affordable consumer drones are a product of the rapid development of smartphone technologies. Making access to the third dimension essentially free and creating commercial opportunities, drones can now deliver groceries and medical supplies to your doorstep.

But endowing drones with human-like cognitive abilities, through AI, will make powerful targeted weapons available to rogue militaries, terrorists, and rampaging teenagers, at a fraction of the cost of the fancy drones that the United States (US) government flies. And unless we take steps to stop this, instructions to turn cheap off-the-shelf drones into automated killers will be posted on the internet.

To date, AI has struggled to provide an accurate identification of objects and faces in the field. It is easily confused when an image is slightly modified by adding text. An image-recognition system that was trained to identify an apple as a fruit was tricked into identifying an apple as an iPod, simply by taping to the apple a piece of paper with the word “iPod” printed on it. Protesters in Hong Kong have used paint on their faces to confound the government facial-recognition efforts. Environmental factors, such as fog, rain, snow, and bright light, too can dramatically reduce the accuracy of AI-using recognition systems.

This may allow forces to adopt relatively simple countermeasures to confound current drone recognition systems, but to actors who already place a low value on collateral damage and innocent victims, such accuracy is a lesser concern than it is to human rights activists and others concerned about the loss of innocent lives.

The effectiveness of drones in zeroing in on targets enables their deployment as new weapons of mass destruction. A swarm of drones bearing explosives and dive-bombing a sports event or any densely populated urban area could kill numerous people and would be hard to stop.

Various companies are now selling drone countermeasure systems with different strategies to stop rogue flying objects, and advanced militaries have already deployed electronic countermeasures to interrupt the control systems of drones. But, so far, shooting down even one drone remains a challenge. Israel recently demonstrated an impressive flying laser that can vaporise drones, but shooting down an entire swarm of them is well beyond our capabilities. And simply blocking communication to the drones is not enough; it may be critical to be able to safely bring them to earth in order to avert random chaos and harm.

To a group intent on causing significant damage, autonomous drones open a field of possibilities. Imagine attacks on 100 different locations on a single day; the effects of the Mumbai or World Trade Center terrorist attacks would pale in comparison.

India is reportedly looking to procure Israeli anti-drone SMASH 2000 Plus systems, among the most advanced defensive weapons in the world. But even these are obsolete technologies: They can’t protect the country from swarms of drones or from attacks launched within cities.

Asymmetrical warfare disproportionately benefits the forces of chaos rather than the forces of liberty. We require a global moratorium on killer robots of all kinds, including unmanned aerial vehicles. But this is not likely to happen because countries making this new wave of autonomous flying weapons are marketing their wares heavily. The US and China have both refused to back calls for a ban on the development and production of fully autonomous weapons, and so are providing a cover of tacit, putative legitimacy for weapons-makers and governments deploying the drones in the field.

In order to be able to establish a defence against such possibilities, India must put its own scientists and innovators on war-footing. India has the skill and doesn’t need to look abroad; even Indian teenagers can assemble drones and write sophisticated AI systems. The Defence Research and Development Organisation has some systems in development, but the government should

dramatically increase funding in research and startups and have its military, industry, and academia work together. It should make the development of defensive technologies a national priority, just as China has in developing destructive weapons and surveillance systems.

In anticipating the Covid-19 pandemic, India was complacent. We have long known about the dangers of genetic engineering and the possibility of lab accidents, yet did not halt China's reckless research or prepare bio-defences against it. Yes, the rest of the world was equally complacent. But in failing to anticipate the development of artificially intelligent killer drones, that mitigating circumstance will offer no help and no excuse.

(Vivek Wadhwa is the author of From Incremental to Exponential: How Large Companies Can See the Future and Rethink Innovation, and The Driver in the Driverless Car: How Our Technology Choices Will Create the Future).

The views expressed are personal.

<https://www.hindustantimes.com/opinion/the-killer-drones-are-here-get-ready-101625667800097.html>



Thu, 08 July 2021

Rajagiri bags project to build Ocean visualisation software

Kochi: The Rajagiri Engineering College in Kakkanad has bagged from the Ministry of Defence a unique project for building an ocean visualisation software.

The project, funded by the Naval Research Board (NRB) and to be carried out in collaboration with the Naval Physical and Oceanographic Laboratory (NPOL- the only laboratory of the Defence Research and Development Organisation in Kerala) located at Thrikkakara, will be carried out using an NRB grant of ₹33.78 lakh.

Titled 'An interactive, dynamic and scalable Ocean Visualisation Tool', the project is said to be of use to oceanographers, naval personnel and marine engineers. "It aims to build an ocean visualisation software package that performs scalar and vector visualisation of heterogeneous ocean data, ocean phenomena like waves and ocean current visualisation, interactive visualisation of 2D, 3D and 4D data, and offers a platform for multivariate analysis of diverse ocean data. The high dimensional ocean data is really complex, thus making the task of analysis and visualisation highly challenging. The software package will also aid in the visualisation of data collected by ships and AUVs (autonomous underwater vehicles)," according to Preetha K.G., associate professor in the department of computer science and engineering and one of the investigators of the project. Saritha S, another associate professor, is the co-investigator. Data analytics and visualisation will be used to create a software package that uses high-end algorithms to provide a deeper understanding of the oceans, she said.

<https://www.thehindu.com/news/cities/Kochi/rajagiri-bags-project-to-build-ocean-visualisation-software/article35203932.ece>

COVID 19: DRDO's Contribution

mint

Thu, 08 July 2021

Covid-19: Bajaj Health gets DRDO license to make 2-DG drug

- *The 2-DG is developed by the Institute of Nuclear Medicine and Allied Sciences (INMAS), a lab of DRDO, in collaboration with Dr Reddy' Laboratories*
- *The Centre has recently launched 2-DG as an anti -Covid-19 therapeutic application of the drug 2-Deoxy-D-glucose*

Bajaj Healthcare Limited (BHL) on Wednesday announced that it has received license from DRDO to manufacture 2-DG drug used in control and treatment of Covid-19.

In a regulatory filing, Bajaj Healthcare said, "...has received a licence from Defence Research and Development Organisation (DRDO) to manufacture and market of "2-Deoxy-D-Glucose" (2-DG) as approved medication for the treatment of COVID-19 patients".

The 2-DG is developed by the Institute of Nuclear Medicine and Allied Sciences (INMAS), a lab of DRDO, in collaboration with Dr Reddy' Laboratories.

"We are pleased to add 2-Deoxy-D-Glucose to our growing product portfolios after receiving license from DRDO. Our countries medical infrastructure is really struggling with the scarcity of oxygen capacities. We hope the availability of an effective treatment such as 2-Deoxy-D-Glucose (2-DG) will considerably ease the pressure and offer patients much-needed and timely therapy option. Most patients ailing from moderate to severe symptoms can benefit from the use of Deoxy-D-Glucose," Anil Jain, Joint Managing Director, Bajaj Healthcare said.

Established in 1993, Bajaj Healthcare Limited specialises in manufacturing of Amino Acids, Intermediates, API, formulations & Nutraceuticals.

The government has recently launched 2-DG as an anti -Covid-19 therapeutic application of the drug 2-Deoxy-D-glucose.

Patients treated with 2-DG have shown negative RT-PCR in COVID-19 patients.

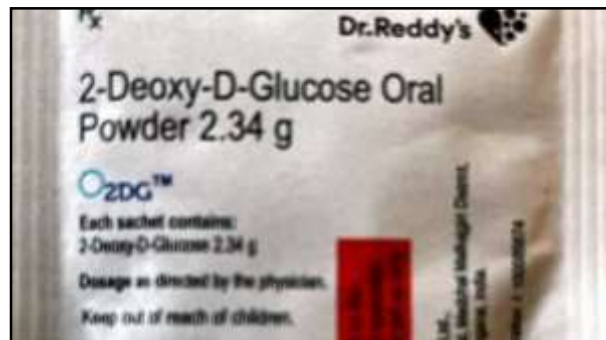
The drug can be administered only upon prescription and under the supervision of a qualified physician to 'hospitalised moderate to severe Covid-19 patients' as an adjunct therapy to the existing standard of care, Dr Reddy's said.

The 2-DG drug comes in powder form in the sachet, which is taken orally by dissolving it in water.

It accumulates in the virus-infected cells and prevents virus growth by stopping viral synthesis and energy production. Its selective accumulation in virally infected cells makes this drug unique.

The Union Health Ministry had claimed that the 2-DG drug can reduce patient's average recovery time by two and a half days and oxygen demand by up to 40%.

<https://www.livemint.com/news/india/covid19-bajaj-health-gets-drdo-license-to-make-2-dg-drug-11625662741799.html>



Price of DRDO's 2DG anti-COVID 19 drug has been kept at Rs. 990 per sachet by Dr Reddy's lab.

Bajaj Healthcare gets license from DRDO to manufacture 2-DG

Bajaj Healthcare has received a licence from DRDO to manufacture and market of "2-Deoxy-D-Glucose" (2-DG) as approved medication for the treatment of COVID-19 patients.

The Defence Research and Development Organisation (DRDO) has granted permissions to manufacture and market the "2-Deoxy-D-Glucose in the domestic market.

2-DG helps in the faster recovery of hospitalised patients and reduces supplemental oxygen dependence. The drug works by selectively accumulating in the virus-infected cells and prevents virus growth by stopping viral synthesis and energy production. It can be administered only upon prescription and under the supervision of a qualified physician to hospitalised moderate to severe COVID-19 patients as an adjunct therapy to the existing standard of care.

Commenting on license received from DRDO for 2-Deoxy-D-Glucose, Anil Jain, Joint Managing Director, Bajaj Healthcare said We hope the availability of an effective treatment such as 2-DG will considerably ease the pressure and offer patients much needed and timely therapy option. Most patients ailing from moderate to severe symptoms can benefit from the use of Deoxy-D-Glucose.

The announcement was made after market hours yesterday, 7 July 2021. Shares of Bajaj Healthcare surged 6.92% to settle at Rs 911.10 yesterday.

Bajaj Healthcare a leading manufacturer of APIs, Intermediates and Formulations. It specializes in manufacturing of of Amino Acids, Intermediates, API, formulations & Nutraceuticals.

(This story has not been edited by Business Standard staff and is auto-generated from a syndicated feed.)

https://www.business-standard.com/article/news-cm/bajaj-healthcare-gets-license-from-drdo-to-manufacture-2-dg-121070800181_1.html

Bajaj Healthcare surges 11% on receiving DRDO nod to manufacture 2-DG

The company has received a licence from DRDO to manufacture and market "2-Deoxy-D-Glucose" (2-DG) as approved medication for the treatment of COVID-19 patients

Mumbai: Shares of Bajaj Healthcare surged 11 per cent to Rs 1,009.80 on the BSE in intra-day trade on Thursday after the company received a licence from Defence Research and Development Organisation (DRDO) to manufacture and market "2-Deoxy-D-Glucose" (2-DG) as approved medication for the treatment of COVID-19 patients.

"2-DG helps in the faster recovery of hospitalised patients and reduces supplemental oxygen dependence. The drug works by selectively accumulating in the virus-infected cells and prevents virus growth by stopping viral synthesis and energy production. It can be administered only upon prescription and under the supervision of a qualified physician to hospitalised moderate to severe COVID-19 patients as an adjunct therapy to the existing standard of care," Bajaj Healthcare said in a release.

Bajaj Healthcare is a leading manufacturer of active pharmaceutical ingredients (APIs), intermediates, and formulations.

It was for the ninth straight day that the stock of the pharmaceutical company was trading higher, having gained 43 per cent during the period. In the past three months, it has soared 120 per cent as compared to a 7 per cent rise in the S&P BSE Sensex.

On June 28, 2021, Bajaj Healthcare had announced that it has moved the Indian Patent Office requesting to grant a compulsory license for manufacturing & supply of Covid-19 drug "Baricitinib" (API and formulation).

Currently, Eli Lilly and company has received Emergency Use Authorization (EUA) from the US Food and Drug Administration (FDA) for the distribution and emergency use of "Baricitinib" to be used in combination with Remdesivir in hospitalized adult and pediatric patients aged more than two years with suspected or laboratory-confirmed COVID-19 requiring supplemental oxygen, invasive mechanical ventilation, or extracorporeal membrane oxygenation (ECMO), Bajaj Healthcare said in a statement.



https://www.business-standard.com/article/markets/bajaj-healthcare-surges-11-on-drdo-nod-to-manufacture-2-dg-121070800262_1.html

नागरिक अस्पताल के आक्सीजन प्लांट में जल्द मशीनें आने की उम्मीद, बाढ़ड़ा में भी लगेगा आक्सीजन प्लांट

चरखी दादरी: दादरी के नागरिक अस्पताल में करीब दो माह पहले बनने शुरू हुए आक्सीजन प्लांट में अभी तक आक्सीजन का उत्पादन शुरू नहीं हो सका है। नागरिक अस्पताल परिसर में आक्सीजन प्लांट के लिए आधारभूत ढांचा बनकर तैयार है। लेकिन अभी तक इसमें आक्सीजन उत्पादन के लिए मशीनें नहीं लगी हैं। स्वास्थ्य विभाग के अधिकारियों का कहना है कि प्लांट में आक्सीजन उत्पादन के उपकरण डीआरडीओ की ओर से जल्द ही भेज दिए जाएंगे। ऐसे में उम्मीद लगाई जा रही है कि इसी सप्ताह में मशीनें लगनी शुरू हो जाएगी। जिसके बाद यहीं पर आक्सीजन का उत्पादन हो सकेगा। इसके साथ ही स्वास्थ्य विभाग द्वारा बाढ़ड़ा में भी आक्सीजन प्लांट स्थापित करने की योजना बनाई जा रही है।

गौरतलब है कि कोरोना वायरस संक्रमण की दूसरी लहर के दौरान हर तरफ आक्सीजन की कमी हो गई थी। जिसके चलते विभिन्न अस्पतालों में आक्सीजन प्लांट स्थापित किए जा रहे थे। इसी कड़ी में मई माह में दादरी के नागरिक अस्पताल में भी नेशनल हाइवे अथारिटी आफ इंडिया, एनएचएआइ के सहयोग से आक्सीजन प्लांट का निर्माण शुरू करवाया गया था। इस प्लांट से प्रति मिनट 500 लीटर आक्सीजन का उत्पादन होना है। इस प्लांट के लिए उपकरण डीआरडीओ द्वारा भिजवाए जाने हैं। नागरिक अस्पताल परिसर में आक्सीजन प्लांट के लिए आधारभूत ढांचा तैयार हो चुका है। इसके साथ ही यहां पर बिजली कनेक्शन भी हो चुका है। लेकिन प्लांट का काम शुरू होने के करीब दो महीने बाद भी यहां पर उपकरण नहीं पहुंच सके हैं। बाढ़ड़ा में भी लगेगा आक्सीजन प्लांट

कोरोना संक्रमण की संभावित तीसरी लहर को ध्यान में रखते हुए स्वास्थ्य विभाग द्वारा बाढ़ड़ा में भी आक्सीजन प्लांट लगवाने को लेकर तैयारियां की जा रही है। विभाग द्वारा योजना पर काम शुरू कर दिया गया है। बता दें कि बाढ़ड़ा उपमंडल के अंतर्गत दर्जनों गांव आते हैं। इन गांवों में लाखों की संख्या में लोग रहते हैं। इनमें से काफी संख्या में लोग उपचार के लिए बाढ़ड़ा व आसपास स्थित स्वास्थ्य केंद्रों में जाते हैं। ऐसे में यदि बाढ़ड़ा में भी आक्सीजन प्लांट स्थापित होता है तो महामारी के दौरान लोगों को इससे काफी फायदा मिलेगा। इसी सप्ताह मशीनें आने की उम्मीद : डा. सुदर्शन

दादरी के सिविल सर्जन डा. सुदर्शन पंवार ने बताया कि आक्सीजन प्लांट के लिए डीआरडीओ द्वारा जल्द ही मशीनें भेजी जाएंगी। उम्मीद है कि इसी सप्ताह मशीनें आ जाएंगी, जिसके बाद उन्हें लगाने का कार्य शुरू हो जाएगा। डा. पंवार का कहना है कि स्वास्थ्य विभाग द्वारा बाढ़ड़ा में भी आक्सीजन प्लांट लगाने को लेकर प्लान बनाया जा रहा है। इसके लिए योजना पर काम शुरू कर दिया गया है।

<https://www.jagran.com/haryana/bhiwani-machine-will-be-reach-shortly-in-oxygen-plant-21809924.html>

तीसरी लहर से निपटने प्रशासनिक तैयारी, प्लांट टेस्टिंग सफल

गोड्डा: कोरोना की संभावित तीसरी लहर से निपटने के लिए सरकार ने विभिन्न स्तर पर तैयारी तेज कर दी है। पूरी आबादी को जहां वैक्सीनेट करने पर जोर दिया जा रहा है, वहीं सदर अस्पताल परिसर में बच्चों के लिए अलग से 40 बेड का कोविड वार्ड तैयार कर लिया गया है। जबकि बीते अप्रैल माह में ही सदर अस्पताल परिसर में 26 बेड का डेडिकेडेड कोविड वार्ड सक्रिय है। इसके साथ ही सदर अस्पताल परिसर में ही पीएम केयर्स फंड से आक्सीजन प्लांट स्थापित कर उसे चालू कर दिया गया है। शीघ्र ही इस पीएसए (प्रेसर स्वींग एप्लायंस) प्लांट का विधिवत उद्घाटन भी किया जाना है। यह प्लांट एक मिनट में 1300 से 1500 लीटर आक्सीजन देगा। सदर अस्पताल में सामान्यतः 150 बेड की क्षमता है। सभी बेड



आक्सीजन स्पोर्ट वाले होंगे। इसमें पाइप लाइन से आक्सीजन की आपूर्ति की जाएगी। पूरे अस्पताल परिसर में आक्सीजन पाइपलाइन बीते माह ही लगा दी गई थी। अब पीएसए प्लांट लगने के बाद आक्सीजन की समस्या का स्थाई समाधान हो गया है। डीआरडीओ और एनएचएआई की देखरेख में स्थापित पीएसए प्लांट के संचालन के लिए सदर अस्पताल के कर्मी प्रशिक्षित किए गए हैं। पोड़ैयाहाट में लगेगा दूसरा पीएसए प्लांट : कोरोना की संभावित लहर से बचाव के लिए स्वास्थ्य विभाग लगातार अपनी क्षमता बढ़ा रहा है। इसके लिए सदर अस्पताल के अलावा पोड़ैयाहाट में भी आक्सीजन प्लांट स्थापित करने की प्रक्रिया शुरू कर दी गई है। बुधवार को सदर अस्पताल में स्थापित आक्सीजन प्लांट को इंस्टाल करने के बाद इसकी टेस्टिंग की गई। वहीं पोड़ैयाहाट में पीएसए प्लांट स्थापित करने की प्रक्रिया अभी चल रही है। सदर अस्पताल में स्थापित आक्सीजन प्लांट की उत्पादन क्षमता की जांच भी कर ली गई है। डीसी भोर सिंह यादव, सिविल सर्जन डॉ शिव प्रसाद मिश्रा, एसडीओ ऋतुराज, सहित स्वास्थ्य विभाग के प्रबंधक व जिले के वरीय अधिकारियों की ओर से लगातार आक्सीजन प्लांट का निरीक्षण भी किया जा रहा है।

सभी प्रखंडों में चाइल्ड कोविड वार्ड तैयार :

सिविल सर्जन डॉ शिव प्रसाद मिश्रा ने बताया कि कोरोना वायरस की संभावित तीसरी लहर (जिसमें बच्चों के ज्यादा संक्रमित होने की संभावना है) को देखते हुए स्वास्थ्य महकमा अलर्ट मोड पर है। कोरोना से बचाव की तैयारी के तौर पर सदर अस्पताल में बच्चों के लिए 40 बेड वाला चाइल्ड कोविड केयर वार्ड तैयार कर लिया गया है। इसके अलावा महागामा के ऊर्जानगर में 25 बेड का कोविड अस्पताल चालू किया गया है। वहीं सुंदरपहाड़ी में 20 बेड का चाइल्ड कोविड केयर वार्ड बनाया गया है। डमरुहाट में 10 बेड का चाइल्ड कोविड केयर वार्ड, पोड़ैयाहाट में 20 बेड का चाइल्ड कोविड केयर वार्ड, रुपचक पथरगामा में 10 बेड का चाइल्ड कोविड वार्ड, राजाभिठ्ठा में 10 बेड का चाइल्ड कोविड केयर वार्ड व बोआरीजोर में 20 बेड का चाइल्ड कोविड वार्ड की व्यवस्था की गई है। सिविल सर्जन ने इमरजेंसी के लिए सभी सीएचसी को भी अलर्ट मोड में रहने को कहा है। कोरोना संक्रमण की तीसरी लहर से बचाव के लिए बीते माह विभिन्न सरकारी व निजी संस्थानों से जंबो ऑक्सीजन सिलेंडर जमा कराया गया था। इसके अलावा समाजसेवियों व जनप्रतिनिधियों ने भी इसमें भरपूर सहयोग किया है। इसमें अदाणी कंपनी की ओर से करीब 200 से अधिक जंबो सिलेंडर मुहैया कराया गया है। वहीं जिला मुख्यालय स्थित गोदाम में इन दिनों 146

आक्सीजन कंसंट्रेटर उपलब्ध है। महागामा विधायक दीपिका पांडेय सिंह ने जिला प्रशासन को नौ कंसंट्रेटर उपलब्ध कराया है। इसके अलावा पेटिएम की ओर से 10 कंसंट्रेटर, वर्ल्ड विजन की ओर से 17 कंसंट्रेटर, खनन विभाग की ओर से दो कंसंट्रेटर, डियागो डिजिटल की ओर से छह कंसंट्रेटर, गिव इंडिया की ओर से 96 कंसंट्रेटर, इमरान फाउंडेशन की ओर से छह कंसंट्रेटर स्वास्थ्य विभाग को उपलब्ध कराया गया है। इसके अलावा पीएम केयर की ओर से जिला को करीब 70 कंसंट्रेटर इस सप्ताह या अगले सप्ताह तक मिल सकता है।

<https://www.jagran.com/jharkhand/godda-news-of-plant-21807740.html>

Business Standard

Thu, 08 July 2021

Medical oxygen from Honeywell technology has saved 120,000 lives in India

*Patented technology of US firm, which tied up with DRDO
last month, to save 66,500 more people in July-August*

By Ajai Shukla

New Delhi: US firm Honeywell UOP is supplying India with the raw material needed for producing medical grade oxygen, which has already saved the lives of an estimated 120,000 Covid-19 patients in this country.

In July and August, another 66,500 Indian patients are expected to recover from Covid-19 with the help of oxygen produced from zeolite, a “medical oxygen adsorbent” that Honeywell UOP produces at a plant in Italy. Honeywell UOP has pledged to supply India with the entire production output of that factory.

Honeywell estimates that 10 kilos of zeolite produce enough oxygen to save one Covid-19 patient’s life. Honeywell UOP has already delivered 1,200 tonnes of zeolite to India by the end of June and is on track to supply another 665 tonnes in July and August.

Honeywell UOP invented the first zeolite materials in the 1940s. This highly porous crystalline material, with tiny molecular-sized pores, extracts oxygen from natural air, by separating the nitrogen, which constitutes 78 per cent of air, from oxygen, which makes up 20 per cent.

In this process, natural air is passed over a bed of zeolite material. The smaller nitrogen molecules get caught in the zeolite’s small pores, while the larger oxygen molecules flow over the material, getting progressively more concentrated as the nitrogen molecules are filtered out. Oxygen is eventually concentrated to 93 per cent using this process.

India does not have a shortage of oxygen, but most manufacturers are located in East India and distribution poses logistical challenges. The oxygen, once manufactured, needs to be transported to the end users in cryogenic tankers and then filled in oxygen cylinders.

The zeolite process provides a good way to supplement oxygen supply to hospitals. Instead of relying on oxygen to be delivered in liquid form, or in oxygen cylinders, the zeolite process allows medical oxygen plants to be fabricated in the immediate vicinity of Covid-19 hospitals.

To help in bringing up these medical oxygen plants, Honeywell UOP announced a partnership last month with the Defence Research Development Organisation (DRDO), the Council of Scientific and Industrial Research and the Indian Institute of Petroleum (CSIR-IIP). DRDO-CSIR



was tasked with identifying and dedicating companies as manufacturing partners to build machines for producing oxygen.

Besides identifying and dedicating companies to manufacture machines for producing oxygen, the DRDO took on a lot of the logistics, such as sending freighter aircraft to Italy to take delivery of the zeolite from the plant. Ships were taking too long and early supply was critical.

“We are redirecting our global supply of Honeywell UOP adsorbents from Italy to India to help the Government of India install life-saving oxygen plants across the country. Our technologists and scientists are collaborating with DRDO and CSIR-IIP scientists to meet India’s needs,” states Akshay Bellare, President, Honeywell India.

“India was not the only country that was requesting zeolites. We were full with requests for medical oxygen. But given how dire the situation here was and how much demand there was from here, we prioritised supply to India over other countries,” said a Honeywell UOP executive.

Honeywell UOP has had a long presence in India. In 2012, it established a Technology Development Centre in Gurugram. This state-of-the-art facility, which carries out R&D for India and the US, is the only such centre Honeywell UOP has outside the US.

Honeywell UOP is also providing renewable fuels technology, which it develops in India, to varied industries, especially in the oil refining and petrochemicals sectors. With the Indian Air Force promoting the use of green fuel in its aircraft, Honeywell has provided its Rapid Thermal Processing (RTP) technology, which converts bio-mass into aviation fuel.

https://www.business-standard.com/article/current-affairs/medical-oxygen-from-honeywell-technology-has-saved-120-000-lives-in-india-121070701487_1.html



Press Information Bureau
Government of India

Ministry of Defence

Wed, 07 July 2021 8:21PM

CINCAN visits Amphibian Brigade

Commander-in-Chief Andaman and Nicobar Command (CINCAN) Lieutenant General Ajai Singh visited the Amphibian Brigade at Birchgunj Military Station on July 06, 2021. He reviewed operations at the Jungle Survival School and inspected various training activities, including driving an ALS through the landing ship ramp simulator at the Wave Generation Training Facility. Addressing the troops, the CINCAN stressed on the need to remain ops ready and prepared at all times. He also advised all personnel to strictly maintain COVID-19 protection measures.

Lieutenant General Ajai Singh also awarded commendation cards to deserving personnel on the occasion.



<https://pib.gov.in/PressReleasePage.aspx?PRID=1733481>



**Press Information Bureau
Government of India**

Ministry of Defence

Wed, 07 July 2021 1:18PM

INS Tabar exercises with Italian Navy off Naples, Italy

As part of the ongoing deployment to the Mediterranean, INS Tabar entered the Port of Naples, Italy on 03 Jul 21. The ship was accorded a warm welcome by the Italian Navy. During the stay in port the Commanding Officer Captain Mahesh Mangipudi called on the senior officers of the Prefect of Naples Authority, the regional Italian Navy Headquarters and the Coast Guard Headquarters at Naples.



On departure from port, the ship also undertook a Maritime Partnership Exercise with ITS Antonio Marceglia (F 597), a frontline frigate of the Italian Navy, on 04 and 05 July 2021 in the Tyrrhenian Sea.

The exercise covered a wide range of naval operations including air defence procedures, replenishment at sea, communication drills and cross deck helo operations by day and night. The exercise was mutually beneficial in enhancing interoperability and towards consolidating combined operations against maritime threats.

The exercise culminated with a 'Steam Past' by the two ships, as per the naval custom.

<https://pib.gov.in/PressReleasePage.aspx?PRID=1733321>



पत्र सूचना कार्यालय
भारत सरकार

रक्षा मंत्रालय

Wed, 07 July 2021 1:18PM

आईएनएस तबर ने इतालवी नौसेना के साथ इटली के नेपल्स के करीब युद्धाभ्यास किया

भूमध्य सागर के लिए चल रही तैनाती के अंतर्गत आईएनएस तबर ने दिनांक 03 जुलाई 2021 को नेपल्स, इटली के बंदरगाह में प्रवेश किया। इस जहाज का इटली की नौसेना ने गर्मजोशी से स्वागत किया। बंदरगाह में अपने प्रवास के दौरान कमांडिंग ऑफिसर कैप्टन महेश मंगीपुडी नेप्रीफेक्ट ऑफ नेपल्स अथॉरिटी, क्षेत्रीय इतालवी नौसेना मुख्यालय और कोस्टगार्ड मुख्यालय में वरिष्ठ अधिकारियों से मुलाकात की।



बंदरगाह से लौटने पर इस पोत ने दिनांक 04 और 05 जुलाई 2021 को इटली की नौसेना के एक अग्रिम फ्रिगेट, आईटीएस एंटोनियो मार्सेग्लिया (एफ 597) के साथ एक

समुद्री साझेदारी युद्धाभ्यास भी किया। इस अभ्यास में रात और दिन में एयर डिफेंस प्रक्रियाओं, समुद्र में पुनःपूर्ति, संचार अभ्यास और क्रॉस डेक हेलो अभियानों समेत नौसैनिक अभियानों की एक विस्तृत श्रृंखला शामिल थी। यह अभ्यास पारस्परिक रूप से अंतरसंचालनीयता बढ़ाने और समुद्री खतरों के खिलाफ संयुक्त अभियानों को मजबूत करने की दिशा में लाभप्रद था।

नौसेना के रिवाज के अनुसार दोनों जहाजों द्वारा 'स्टीम पास्ट' के साथ इस अभ्यास का समापन हुआ।

<https://pib.gov.in/PressReleasePage.aspx?PRID=1733350>

Army Chief Gen Naravane begins 2-day visit to Italy

New Delhi: Chief of Army Staff Gen MM Naravane on Wednesday began a two-day visit to Italy with an aim to further expand bilateral strategic cooperation.

Gen Naravane arrived in Italy from the UK on the second leg of his two-nation tour.

"General MM Naravane #COAS arrived at #Italy on a two-day visit. The visit aims to further strengthen strategic and defence cooperation between both the countries," the Army tweeted.

Officials said the Army Chief will be holding important discussions with the Chief of Defence Staff and Chief of Staff of the Italian Army in Rome.

He is also scheduled to inaugurate an Indian Army memorial in the famous town of Cassino.

The memorial has been built to pay homage to Indian soldiers who lost their lives during World War II.

Gen Naravane's visit to Italy came days after Indian naval ship INS Tabar and Italian frigate ITS Antonio Marceglia carried out a two-day-long maritime partnership exercise in the Tyrrhenian sea.

The exercise on July 4 and 5 covered a wide range of naval operations, including air defence procedures, replenishment at sea, communication drills and cross-deck helo operations by day and night, an Indian Navy spokesperson said.

"The exercise was mutually beneficial in enhancing interoperability and towards consolidating combined operations against maritime threats," he said. PTI MPB KJ

(Disclaimer This story has not been edited by Outlook staff and is auto-generated from news agency feeds. Source: PTI)

<https://www.outlookindia.com/newscroll/army-chief-gen-naravane-begins-2day-visit-to-italy/2116490>

Govt can evaluate splitting P75I submarine contract between two bidders: Mazagon Shipbuilders

L&T likely to be the second partner, if the govt decides to share the project. It takes eight years from the awarding of the contract to the handing over of the first submarine. Splitting the project between two firms can cut down delivery time. Given the geopolitical situation, the govt may not like the project to be delayed

By Swaraj Baggonkar

India's order for six conventional submarines, costing Rs 43,000 crore, could go to two companies instead of one, given the current geopolitical situation, a top official of one of India's submarine makers has claimed.

The Request for Proposal (RFP) for the construction of the Project P 75 (I) submarines under the strategic partnership model is expected to be issued in July. The Defence Acquisition Council has given the go-ahead for the same in June.

The order will go either to Mazagon Dock Shipbuilders (MDL) or Larsen & Toubro (L&T) -- the two domestic companies which have to partner with one of the five international original equipment manufacturers (OEM).



If the government looks at the possibility of having parallel production of more than just one submarine at a time this would dramatically reduce the time required to produce the vessels.

Narayan Prasad, Chairman and Managing Director, said: "In the current geopolitical scenario, if the government concludes that the threat perception in the Indian Ocean Region and the South China Sea is so pronounced that they need parallel production of these vessels in a shorter horizon, such concepts can also be conceived. I can't rule it out."

The acquisition, which is one of the biggest under the 'Make in India' strategic partnership model, is aimed at boosting India's submarine fleet, most of which are over 25 years old.

Tech cross-transfer possible

"At any point of time, when the government decides that (MDL and L&T) can join (forces), there could be a cross transfer of technology to quickly build the submarines. We can examine those possibilities, and that is a huge potential. We will not be able to rule it out completely," Prasad added.

It would take about eight years from the awarding of contract to the handing over the first submarine to the Indian Navy. The delivery of the remaining submarines will be done at an interval of 12-15 months. If the order is split between MDL and L&T, it would substantially cut down the delivery period.

The five global OEMs are Russia's Rosoboronexport, Germany's ThyssenKrupp, France's Naval Group, Spain's Navantia and South Korea's Daewoo Shipbuilding & Marine Engineering. These companies were shortlisted by an empowered committee last year.

After the RFP floated, they will give about four months' time for bid submission. This is a very complex programme, in which there is a field evaluation trial of a new technology called air independent propulsion system. All the five technology partners are located in five different countries, so this will take a certain amount of time," Prasad added.

These conventional diesel-electric submarines are bigger than the six Scorpene-class submarines manufactured by MDL in Mumbai. Three such Scorpene submarines (P75) have been handed over to the Indian Navy while the fourth, INS Vela, is set to join the forces before the end of FY22.

<https://www.moneycontrol.com/news/business/companies/govt-can-evaluate-splitting-p75i-submarine-contract-between-two-bidders-mazagon-shipbuilders-7140401.html>

Business Standard

Thu, 08 July 2021

China indulging in 'unrestricted warfare' against India, says report

Two Chinese officers in 1999 put forward different methods to beat the US, these were the methods that could be used by nations that could not compete with the West in terms of military

Two Chinese officers in 1999 put forward different methods to beat the US, these were the methods that could be used by nations that could not compete with the West in terms of military.

In their book, *Unrestricted Warfare: China's Master Plan to Destroy America*, they suggested ways to avoid a military confrontation with the US military, these ways included targeting financial systems, economical setbacks, taking infrastructure under control, cyber attacks, political propaganda and other 'indirect wars', said Author Janet Levy in *American Thinker*.

Undoubtedly, these tactics have been accepted by the Chinese government, especially, against the US ally India.

The Chinese Communist Party (CCP) came into power in 1949, a time when newly independent India was being led by Prime Minister Jawaharlal Nehru and it was seen as the only answer to China in the region. But several events in the last two years have highlighted China's attempts to ravage the world's largest democracy, these include stealth appropriation of territory, skirmishes along the Sino-Indian border, several crippling cyber-attacks, the use of unorthodox weapons, including one that caused an extensive power outage in India's financial hub Mumbai, the diversion of shared water resources, and a treacherous geostrategic alliance with India's archenemy Pakistan. China is deploying both Sun Tzu's *The Art of War* and the PLA officers' *Unrestricted Warfare* as playbooks, *American Thinker* reported.

Last year, China also surprised Indian troops on LAC, violating a decades-old bilateral agreement. India was forced to respond with a restricted number of troops. In this skirmish, 20 Indian soldiers were killed and 75 injured. Several experts suggest that China has used 'microwave weapons' against Indian troops, that were effective up to a kilometer, cleverly dodging the "no live shot" rules of engagement. These mentioned this 'microwave technology' as something that heats up fluid under the skin, causing intense pain and vomiting and that resulted in Indian troops retreating after becoming violently ill.

Though border clashes between Indo-Chinese soldiers have been frequent, but in recent years, the PLA has built establishments, conducted war drills, and even tried to occupy territories. China has also used these tactics against other countries in the region. Calling off the troops when countries protest but yet intruding again.

In *American Thinker*, Janet Levy also mentioned that China's attacks on all fronts are well coordinated. At the height of the border standoff, there was a 200% increase in cyber attacks on Indian IT and banking systems over five days, with more than 40,000 attempts by Chinese hackers



Photo: Shutterstock

to install the malware in Indian networks. Chinese-sponsored groups also mounted espionage operations against India's power and transportation sector, including two ports.

The grand power-cut in Mumbai in 2020, that shuttered the complete infrastructure including stopped trains, closure of the stock market, hours of power cut in hospitals amid deadly pandemic was allegedly the result of an attack by the Chinese military group RedEcho.

A mega-dam that China is building on their side of the Brahmaputra River could also give India's water control to CCP, yet another potentially 'without gun' win over the world's largest democracy.

The American Thinker also reported that China is acquiring geostrategic control that is already posing a major threat to India. It has expanded its interests by cultivating politicians in Nepal, building infrastructure in Bhutanese villages, virtually owning a port in Sri Lanka that's within 100 kilometers of India, cultivating nearly 70 countries through its Belt and Road Initiative, and embracing India's archrival Pakistan with the China-Pakistan Economic Corridor.

Indo-China clash is way deeper than what it looks like on the ground, it's all a part of CCP's attempt to outweigh and destabilize the US through undermining India, the biggest democracy and a stalwart US ally. Chinese Communist Party is indeed a practical implementation of Sun Tzu's 'Art of War'. Author Janet Levy said in American Thinker.

(Only the headline and picture of this report may have been reworked by the Business Standard staff; the rest of the content is auto-generated from a syndicated feed.)

https://www.business-standard.com/article/current-affairs/china-indulging-in-unrestricted-warfare-against-india-says-report-121070700289_1.html



Thu, 08 July 2021

Quantum particles: Pulled and compressed

Very recently, researchers led by Markus Aspelmeyer at the University of Vienna and Lukas Novotny at ETH Zurich cooled a glass nanoparticle into the quantum regime for the first time. To do this, the particle is deprived of its kinetic energy with the help of lasers. What remains are movements, so-called quantum fluctuations, which no longer follow the laws of classical physics but those of quantum physics. The glass sphere with which this has been achieved is significantly smaller than a grain of sand, but still consists of several hundred million atoms. In contrast to the microscopic world of photons and atoms, nanoparticles provide an insight into the quantum nature of macroscopic objects. In collaboration with experimental physicist Markus Aspelmeyer, a team of theoretical physicists led by Oriol Romero-Isart of the University of Innsbruck and the Institute of Quantum Optics and Quantum Information of the Austrian Academy of Sciences is now proposing a way to harness the quantum properties of nanoparticles for various applications.

Briefly delocalized

"While atoms in the motional ground state bounce around over distances larger than the size of the atom, the motion of macroscopic objects in the ground state is very, very small," explain Talitha Weiss and Marc Roda-Llordes from the Innsbruck team. "The quantum fluctuations of nanoparticles are smaller than the diameter of an atom." To take advantage of the quantum nature of nanoparticles, the wave function of the particles must be greatly expanded. In the Innsbruck quantum physicists' scheme, nanoparticles are trapped in optical fields and cooled to the ground state. By rhythmically changing these fields, the particles now succeed in briefly delocalizing over exponentially larger distances. "Even the smallest perturbations may destroy the coherence of the particles, which is why by changing the optical potentials, we only briefly pull apart the wave function of the particles and then immediately compress it again," explains Oriol Romero-Isart. By repeatedly changing the potential, the quantum properties of the nanoparticle can thus be harnessed.

Many applications

With the new technique, the macroscopic quantum properties can be studied in more detail. It also turns out that this state is very sensitive to static forces. Thus, the method could enable highly sensitive instruments that can be used to determine forces such as gravity very precisely. Using two particles expanded and compressed simultaneously by this method, it would also be possible to entangle them via a weak interaction and explore entirely new areas of the macroscopic quantum world. Together with other proposals, the new concept forms the basis for the ERC Synergy Grant project Q-Xtreme, which was granted last year. In this project, the research groups of Markus Aspelmeyer and Oriol Romero-Isart, together with Lukas Novotny and Romain Quidant of ETH Zurich, are pushing one of the most fundamental principles of quantum physics to the extreme limit by positioning a solid body of billions of atoms in two places at the same time.

More information: T. Weiss et al, Large Quantum Delocalization of a Levitated Nanoparticle Using Optimal Control: Applications for Force Sensing and Entangling via Weak Forces, *Physical Review Letters* (2021). DOI: [10.1103/PhysRevLett.127.023601](https://doi.org/10.1103/PhysRevLett.127.023601)

Journal information: [Physical Review Letters](#)

<https://phys.org/news/2021-07-quantum-particles-compressed.html>

Researchers discover origin of near ultraviolet and visible absorption characteristics of Ti: sapphire laser crystals

By Zhang Nannan

Recently, a research group from the Shanghai Institute of Optics and Fine Mechanics (SIOM) of the Chinese Academy of Sciences (CAS) carried out a theoretical study on the origin of Ti: sapphire laser crystal in near ultraviolet and visible regions using the first principles method based on density functional theory. Related research results have been published in *Materials Today Communications*.

Ti: sapphire, also known as Ti-doped α - Al_2O_3 single crystal, is a very important laser crystal material. At present, it is also one of the key materials in a class of super-intense, ultrafast, and tunable laser devices. Since the laser properties of it was reported in 1982, the origin of some suspicious absorption phenomena in the optical absorption band of Ti: sapphire has been one of the focuses of attention and research.

According to the wavelength distribution, these questionable absorption bands can be roughly divided into three regions: the near ultraviolet absorption band with a peak at 390 nm, the visible absorption band with multi-peak configuration and small bumps, and the residual infrared absorption band overlapped with the laser emission band.

In this study, the researchers performed a systematic theoretical study on the suspicious absorption phenomenon of Ti: sapphire in near ultraviolet and visible regions.

Through the analysis of the crystal structure of alumina and the calculation of the electronic and optical properties of the possible single Ti doping defect models and Ti ion pair defect models in Ti: sapphire, they pointed out that when there is an Al vacancy near the interstitial Ti_3^+ , the interstitial Ti_3^+ will enter the Al vacancy through structural relaxation, and finally form defect equivalent to the substitutional Ti_3^+ .

The charge transfer transition of substitutional Ti_3^+ ion's 3d electron from Ti 3d orbital to Al 3s3p orbital is the main reason for the near ultraviolet absorption band, and the calculated absorption spectra are in good agreement with the experimental spectra.

Moreover, the multi-peak configuration and bumps of the visible absorption band are mainly caused by the contribution of the line-contact $\text{Ti}_3^+-\text{Ti}_3^+$, face-contact $\text{Ti}_3^+-\text{Ti}_3^+$, and point-contact $\text{Ti}_4^+-\text{Ti}_3^+$ ion pairs. In addition, the researchers provided a more comprehensive understanding of the multi-peak configuration and bumps of visible absorption bands from the perspective of ligand field theory and thermal activation.

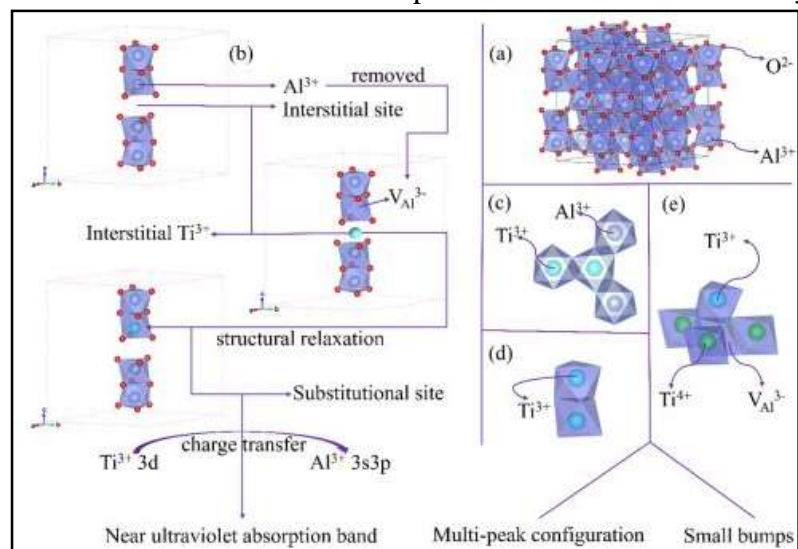


Fig. 1. (a) The supercell structure of Al_2O_3 , (b) the interstitial Ti_3^+ , Al vacancy and substitutional Ti_3^+ models, and their transformation process, (c) the line-contact $\text{Ti}_3^+-\text{Ti}_3^+$ ion pair model, (d) the face-contact $\text{Ti}_3^+-\text{Ti}_3^+$ ion pair model, (e) the point-contact $\text{Ti}_4^+-\text{Ti}_3^+$ ion pair model (Al vacancy is considered as the charge compensation mechanism of Ti_4^+). Credit: SIOM

This study not only reveals the origin of the suspicious absorption characteristics in Ti-doped Al_2O_3 crystal but also provides ideas for the study of defects and properties of similar transition metal ions doped oxides having corundum structure.

More information: Qiaorui Gong et al, Theoretical study on near UV and visible optical absorption characteristics of Ti-doped $\alpha\text{-Al}_2\text{O}_3$ single crystals, *Materials Today Communications* (2021). DOI: [10.1016/j.mtcomm.2021.102506](https://doi.org/10.1016/j.mtcomm.2021.102506)

<https://phys.org/news/2021-07-ultraviolet-visible-absorption-characteristics-ti.html>



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Quantum laser turns energy loss into gain

Scientists at KAIST have fabricated a laser system that generates highly interactive quantum particles at room temperature. Their findings, published in the journal *Nature Photonics*, could lead to a single microcavity laser system that requires lower threshold energy as its energy loss increases.

The system, developed by KAIST physicist Yong-Hoon Cho and colleagues, involves shining light through a single hexagonal-shaped microcavity treated with a loss-modulated silicon nitride substrate. The system design leads to the generation of a polariton laser at room temperature, which is exciting because this usually requires cryogenic temperatures.

The researchers found another unique and counter-intuitive feature of this design. Normally, energy is lost during laser operation. But in this system, as energy loss increased, the amount of energy needed to induce lasing decreased. Exploiting this phenomenon could lead to the development of high efficiency, low threshold lasers for future quantum optical devices.

"This system applies a concept of quantum physics known as parity-time reversal symmetry," explains Professor Cho. "This is an important platform that allows energy loss to be used as gain. It can be used to reduce laser threshold energy for classical optical devices and sensors, as well as quantum devices and controlling the direction of light."

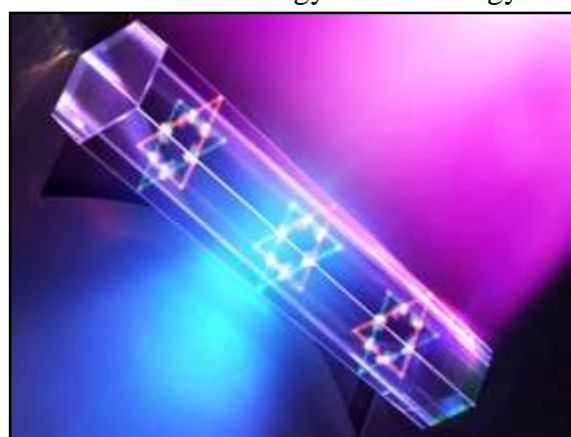
The key is the design and materials. The hexagonal microcavity divides light particles into two different modes: one that passes through the upward-facing triangle of the hexagon and another that passes through its downward-facing triangle. Both modes of light particles have the same energy and path but don't interact with each other.

However, the light particles do interact with other particles called excitons, provided by the hexagonal microcavity, which is made of semiconductors. This interaction leads to the generation of new quantum particles called polaritons that then interact with each other to generate the polariton laser. By controlling the degree of loss between the microcavity and the semiconductor substrate, an intriguing phenomenon arises, with the threshold energy becoming smaller as energy loss increases.

More information: Hyun Gyu Song et al, Room-temperature polaritonic non-Hermitian system with single microcavity, *Nature Photonics* (2021). DOI: [10.1038/s41566-021-00820-z](https://doi.org/10.1038/s41566-021-00820-z)

Journal information: [Nature Photonics](https://doi.org/10.1038/s41566-021-00820-z)

<https://phys.org/news/2021-07-quantum-laser-energy-loss-gain.html>



Exciton-polaritonic PT symmetry: Direct coupling between upward- and downward-polariton modes in a six-fold symmetric microcavity with loss manipulation leads to PT-symmetry breaking with low-threshold phase transition. Credit: The Korea Advanced Institute of Science and Technology (KAIST)



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Covid-19 vaccine-related blood clots linked to amino acids in new study

By Damudat Naik

The peer-reviewed findings, by a group of researchers from McMaster University in Ontario, have been revealed on-line Wednesday by the science journal Nature. They might assist docs quickly check for and deal with the weird clotting, arising from an immune-driven mixture of coagulation and lack of platelets that cease bleeding.

The Canadian study analyzed blood samples from AstraZeneca vaccine recipients and builds on current analysis finished in Europe and elsewhere into the rare blood clots linked to the vaccine. Health officers are monitoring the uncommon unwanted side effects balanced with the vaccines' confirmed worth in combating Covid-19. The blood clotting, which some scientists have named vaccine-induced immune thrombotic thrombocytopenia, or VITT, has additionally been linked to Johnson & Johnson's Covid-19 shot, although incidents have occurred much less often with that shot than with AstraZeneca.

Though uncommon, the situation has confirmed lethal in greater than 170 adults post-vaccination in the U.Okay., Europe and U.S., in accordance to authorities tallies. Many have been youthful adults who appeared wholesome earlier than vaccination, researchers and drug regulators say.

The corporations have mentioned they're endeavor additional analysis to perceive the problems and {believe} the vaccines' advantages outweigh the dangers. Health and authorities officers have mentioned that the advantages of each vaccines typically outweigh their dangers however suggest warnings in regards to the potential dangers.

Mortimer Poncz, pediatric-hematology division chief on the Children's Hospital of Philadelphia, who wasn't concerned in the study, mentioned the findings might assist docs quickly establish VITT and get researchers nearer to understanding what causes it. Another VITT researcher, Andreas Greinacher, professor of transfusion medication at Germany's Greifswald University Clinic, referred to as the findings "extremely attention-grabbing" as a new clue to vaccine-induced clotting that would enhance therapy.

Scientists say analysis about Covid-19 vaccines might affect the protection of photographs and coverings for different makes use of. Mass inoculations have supplied a uncommon probability to study unwanted side effects that may go unnoticed in smaller vaccination drives.

Rare studies of blood clots first surfaced in early March amongst individuals in Europe who had obtained the vaccine developed by AstraZeneca and the University of Oxford. Since then, the U.Okay., Canada, Australia and international locations in Europe and globally have restricted use of the vaccine to older adults, with some international locations declining to use the shot in any respect. Sometimes-deadly blood clotting has additionally surfaced amongst individuals in the U.S. and Europe who've obtained the J&J shot.

AstraZeneca, with greater than 600 million doses distributed globally, stays an necessary vaccine, notably for international locations missing entry to more-expensive photographs, however isn't licensed to be used in the U.S.

Researchers are racing to perceive the uncommon mixture of low blood platelets and clots and their connection to the vaccine in the hopes of fast prognosis and therapy and in the end clot prevention—presumably by altering the photographs' make-up.

VITT has occurred in 1 to 2 individuals per 100,000 first doses of the AstraZeneca shot in the U.Okay., with instances extra widespread in individuals beneath 50. The complete variety of instances after first or second doses in the U.Okay. was 395 via June 23, of roughly 45.2 million doses administered. Of the 395, 70 individuals have died.

European officers mentioned this month that they've seen 479 potential instances of VITT out of 51.4 million AstraZeneca vaccinations, or simply beneath 1 per 100,000 vaccinations. Far fewer potential instances—21 out of seven million vaccinations, or about 0.30 per 100,000 individuals—adopted J&J vaccinations in Europe. Of these instances, 100 deaths occurred after AstraZeneca vaccination and 4 after Johnson & Johnson, European regulators mentioned.

U.S. well being officers mentioned in late June that they've recognized 38 confirmed instances of the blood-clotting syndrome out of greater than 12.3 million individuals who obtained the J&J vaccine, correlating to a frequency of about 0.31 in 100,000. The Centers for Disease Control and Prevention mentioned in May that three instances had been deadly and proof “suggests a believable causal affiliation” between the mix of low platelets and clotting and the vaccine. The CDC didn't reply to requests for remark.

Both photographs are so-called viral-vector vaccines, which use altered chilly viruses to ferry genetic materials into human cells instructing them to create Covid-19 spike proteins. That motion spurs the immune system to create antibodies and defensive white blood cells that prime the physique for a protecting response in opposition to Covid-19.

But in uncommon instances, vaccinated individuals have skilled an autoimmune response in which antibodies bind with uncommon energy to a blood part referred to as platelet issue 4, or PF4, forming distinct clusters resembling a bunch of grapes. This so-called immune advanced, a molecular formation in the blood, prompts extra platelets, “like placing a match to gasoline,” mentioned John Kelton, an creator of the Nature paper and researcher at McMaster University. He is concerned in testing blood from individuals throughout Canada who develop blood clots after Covid-19 vaccination.

The course of accelerates, he and different researchers say, triggering simultaneous bleeding and clotting, typically in the mind, abdomen and different areas that may in uncommon instances be lethal. “We assume these antibodies are unbelievable amplifiers, in a foul means, of the traditional coagulation system,” says Dr. Kelton, who has been learning clotting results of the blood-thinning drug heparin because the Eighties.

For the Nature article, he and fellow researchers analyzed blood from 5 individuals aged 35 to 72 who developed VITT after a single dose of the AstraZeneca vaccine. They in contrast the platelet and clotting responses to observations from 10 individuals who had suffered heparin-induced thrombocytopenia, or HIT, and 10 wholesome individuals.

Using strategies developed in half to study HIT, they mapped out the place the VITT antibodies clung to the PF4. The antibodies reliably focused eight floor amino acids, a fraction of PF4's complete.

“That's the place the forest hearth begins,” said Ishac Nazy, another McMaster University researcher and an author of the Nature study. “These amino acids are super important to VITT but not to HIT.”

(This story has been revealed from a wire company feed with out modifications to the textual content)

<https://newslogic.in/science-news/covid-19-vaccine-related-blood-clots-linked-to-amino-acids-in-new-study/>

