

News Clips
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June 1

IIT opens portal to offer counselling

<https://www.telegraphindia.com/states/north-east/iit-opens-portal-to-offer-counselling-234494?ref=north-east-new-stry>



Saathi counselling centre at IIT Guwahati

Come August, students of IIT Guwahati battling depression will be able to seek counselling without disclosing their voices or identity.

After a counselling centre and a helpline number, the institute is starting an online portal as well for anonymous counselling of students.

Saathi counselling centre of the IIT, set up in 2010, recently signed a memorandum of understanding with a Bangalore-based mental health support company for launching the portal. "The portal is part of the institute's initiative to improve facilities for mental support to its students. They can walk into the centre from Monday to Friday or call on the helpline number (8486814024) at any time. The portal will help students seek counselling by logging into it and sharing their problems online. Our counsellors will try to reply to their queries as soon as possible. The portal will be useful because many do not want to call up the centre or visit in person to avoid showing their face or exposing their voice," Ayush Choudhury, secretary of a students' group who is part of the counselling centre, said.

The centre has catered to over 6,000 students since its launch. "All the 700 new students who take admission into the IIT and come from different parts of the country are provided compulsory counselling. Others can walk into the centre anytime during their stay here. Most of the students who visit the centre seeking counselling complain of depression when their cumulative grade point average score is low or because of homesickness," Choudhury, a third year BTech student from Jharkhand, said.

A similar portal for anonymous counselling of students has proved useful in IIT Bombay, IIT Delhi and IIT Kharagpur. The Saathi counselling centre has four counsellors. At least, 48 students of the institute are also part of the centre.

"Apart from helping students and looking after their problems, we (students' body) also take up welfare activities like teaching underprivileged children in villages close to our institute," he said.

उपलब्धि: आईआईटी पटना के छात्रों ने बनायी फॉर्मूला स्टूडेंट रेसिंग कार

<https://www.livehindustan.com/bihar/story-formula-student-racing-car-created-by-iit-patna-students-1989904.html>



आईआईटी पटना के मैकेनिकल इंजीनियरिंग विभाग के 25 छात्रों की टीम ने फॉर्मूला स्टूडेंट रेसिंग कार बनायी है। कार की लागत पांच लाख है। खास बात यह है कि कार की डिजाइन और सारा मैनुफैक्चरिंग इसी टीम ने किया है। सस्पेंशन सिस्टम से लेकर चैसिस व टायर तक खुद छात्रों ने बनाए हैं। सेकेंड इयर के छात्र आशीष उपाध्याय व रौशन की टीम ने दिन-रात एक कर कार को तैयार किया है। यह रेसिंग कार 11 से 16 जून तक चलने वाली सुप्रा एसएई इंडिया कॉम्पिटिशन में भाग लेगी। ग्रेटर नोएडा के बुद्धा इंटरनेशनल सर्किट में इसका आयोजन होगा। देश से करीब 122 टीमों इस कॉम्पिटिशन में भाग लेंगी। .

छह माह में बनी है कार

इस कार को बनाने में कछह महीने लगे हैं। टीम के कैप्टन आशीष ने बताया कि यह मिनी फॉर्मूला रेसिंग कार है जिसमें केटीएम 390 की इंजन लगाई गई है। इसकी रफ्तार 105 किमी प्रति घंटे है। इसे हल्की रखने के लिए एल्युमिनियम का इस्तेमाल किया गया है। फॉर्मूला वन रेसिंग कार काफी हल्की होती है जिसके कारण यह महंगी भी होती है। हमने इस कार को हल्का रखने के लिए एल्युमिनियम के पार्ट का इस्तेमाल किया है। इसकी बाँडी मात्र 43 किलो है और टायर भी छोटे रखे गए हैं। बाँडी बनाने में ऐसे स्टील रॉड का प्रयोग किया गया है जिसमें कार्बन कंटेंट होते हैं। इसके पार्ट्स लाने में काफी दिक्कत हुई क्योंकि ये पटना में मिलते नहीं हैं। इसके लिए कई जगहों से जाकर पार्ट लाने पड़े। कार की स्पॉन्सरशिप रेडिक कंसल्टेंसी और नेशनल इन्श्योरेंस कॉरपोरेशन ने की है।

डिजाइन की होगी टेस्टिंग

आशीष ने बताया कि इस कॉम्पिटिशन में तीन हजार छात्र भाग लेंगे। इसमें कार की डिजाइन की एनालिसिस और रेसिंग की भी टेस्टिंग होगी। अगर इस कार को अच्छा स्थान मिलता है तो हम अपना आइडिया किसी कंपनी के साथ शेयर कर सकते हैं।

सबसे बेहतर प्रोजेक्ट

स्टूडेंट रेसिंग कार अन्य फॉर्मूला रेसिंग कार से अलग है। कारों की डिजाइन पूरी तरह छात्रों की टीम करती है। छात्रों को मेटेरियल स्ट्रक्चर, एयरोडायनेमिक्स, सस्पेंशन डायनेमिक्स, इंटरनल कंबशन इंजन के बारे में पूरी तकनीकी जानकारी होती है। मैकेनिकल इंजीनियरिंग के छात्रों के लिए स्टूडेंट रेसिंग कार बनाने को सबसे बेहतर प्रोजेक्ट माना जाता है।

May 31

IIT-BHU to get an incubation centre for promotion of Purvanchali languages

https://www.business-standard.com/article/news-ani/iit-bhu-to-get-an-incubation-centre-for-promotion-of-purvanchali-languages-118053100093_1.html

Union Minister Ravi Shankar Prasad announced that the Centre will provide Rs. 3 crore for setting up an incubation centre at IIT-BHU to promote Purvanchali languages.

While addressing a press conference on the achievements of the Modi government in its four years in office, Prasad said, "The government will provide Rs 3 crore for setting up an incubation centre at IIT-BHU where Purvanchali languages like Awadi, Bhojpuri, Maithili, and Magahi can be studied in digital form."

Apart from this, the Union Minister said that an Income Tax Appellate Tribunal will be established within a month in Varanasi, so that those having any dispute can appeal at the tribunal and don't need to travel to places like Allahabad and Lucknow.

He said under the Bharatiya Janata Party (BJP) rule, the government has remained transparent and corruption-free.

Prasad further underscored that the development of youth and farmers is necessary for the country's progress and that the BJP-led Centre was making all needed efforts in this direction.

Prasad further underlined that the government is also mulling ways to strengthen the education system in the state.

May 30

Indian scientists find new clues to Parkinson's

<https://www.thehindubusinessline.com/news/science/indian-scientists-find-new-clues-to-parkinsons/article24035714.ece>

Despite research over decades, scientists are yet to figure out the cause for the Parkinson's disease. One thing is clear that aggregation of a protein called alpha synuclein plays a key role in development of the disease. The aggregation pathway of this protein is subject of intense research. Studies so far have focused on protein aggregates, amyloid fibrils, which form late in the aggregation pathway.

Researchers at the CSIR- Indian Institute of Chemical Biology (CSIR-IICB) in Kolkata have now proposed that alpha synuclein oligomers which come into the picture early in the aggregation pathway could be responsible for development of Parkinson's.

They have shown that the protein in its native form, early oligomers and amyloid fibrils affect each other in the aggregation landscape. They used two amino acids to conduct their study in live neuroblastoma cells. The first one was glutamate, which happens to assist the formation of amyloid fibrils by facilitating generation of early oligomers. The second one was arginine, which inhibits amyloid fibril formation by inducing a large change in the shape of the native protein.

The study has shown it is possible to monitor early events of the aggregation pathway when the native protein fluctuates in its monomeric states or when it forms early oligomeric molecules by using a combination of conventional methods and spectroscopy at the single molecule level.

"We have shown that it is possible to monitor and understand the early events in aggregation. It gives us hope that a therapeutic molecule may be possible against early oligomeric molecules," Dr Krishnananda Chattopadhyay, leader of the research team, told India Science Wire.

"The study establishes that glutamate acts as a facilitator and arginine acts as an inhibitor of the late stage of alpha synuclein aggregation. However, it is not clear if the observed effect is because of other cellular changes due to the addition of these molecules or direct interaction of these molecules with alpha-synuclein. The mechanism of internalization and interaction of these molecules with alpha-synuclein needs to be better understood. It will also be challenging how one can transform this knowledge for drug development for a complex disease like Parkinson's", commented Dr. Samir K.Maji of IIT Bombay, who was not connected with the study.

Besides Dr. Chattopadhyay, his colleagues Sumantha Ghosh and Amrita Kundu, were involved in the study. The research results have been published in journal Scientific Reports.

The work was funded by the Department of Science and Technology (DST).

IITKGP-Oxford collaboration addressing global water challenge

<https://www.thehindubusinessline.com/news/science/iitkgp-oxford-collaboration-addressing-global-water-challenge/article24032812.ece>

Researchers at the IIT KGP, developed an ultra-low cost, novel technology that acts as an adsorbent to filter arsenic.

Researchers from IIT Kharagpur and Oxford University have entered into a collaboration to develop a better understanding of the filtration process of water and cope with global water challenge.

While the collaboration is addressing arsenic contamination of water for drinking and other types of human use, the research has been extended to filtration of other water pollutants as well, an IIT KGP statement said on Wednesday.

Pointing out that the Ganges-Brahmaputra Delta is a global hotspot for arsenic groundwater contamination, the statement said, chemical leaching within fertile farmland soils, as a result of overuse of pesticides and fertilizers, is also widespread in the country.

Researchers at the IIT KGP, led by Professor Sirshendu De of the chemical engineering department, recently developed an ultra-low cost, novel technology by chemically activating naturally available laterite that acts as an adsorbent to filter arsenic.

“Based on our research at IIT KGP, filtered water can now be produced at just 2 paisa per litre, thus making it ideal for a country like India,” Professor De said. This part of developing ultra-low cost novel technology had been done by the IIT KGP team only.

A team of mathematicians from Oxford University, led by Dr Ian Griffiths, then worked on the mathematical modelling techniques which helped extending the life of the filter and the design of scaled-up filters.

“Inter-disciplinary approaches are becoming increasingly important to make progress in present-day challenges and this project is a clear example of such a case,” Professor Griffiths said.

The collaborative developed technology has already been accepted by the Department of Science & Technology, Union Government, PHE department government of West Bengal and the West Bengal Arsenic Task force.

The collaborative project has been funded by the Global Challenge Research Fund (GCRF-UK), University of Oxford.

May 29

Ansari: Central nod to IIT, IIM incubation centres in Srinagar

<http://www.tribuneindia.com/news/jammu-kashmir/ansari-central-nod-to-iit-iim-incubation-centres-in-srinagar/596924.html>

Union Human Resource Development Minister Prakash Javadekar has given the nod to the opening of incubation centres for the IIT and IIM in Srinagar.

This was stated by the Minister for Higher Education, Technical Education and Information Technology Molvi Imran Raza Ansari who had a meeting with the HRD Minister in New Delhi to discuss matters pertaining to the education sector in the state.

Ansari said steps were underway to strengthen higher education in the state. He said the HRD Minister had agreed to establish incubation centres of the IIT and IIM in Srinagar.

The minister said a team of the IIM-Lucknow had visited Kashmir in December last year to identify a rented building for running the incubation centre in the summer capital. The team has identified the building and the further course of action by the IIM-Jammu is awaited, he said.

He said the department had taken up the issue of creation of the off-campus of the IIT-Jammu in Srinagar. He said necessary action in this behalf is still awaited by the IIT-Jammu.

The minister demanded establishment of an Indian Institute of Science Education and Research in the state.

Ansari informed the Union Minister that the University of Kashmir and 46 colleges had applied for NAAC accreditation but the team had not visited the campuses for evaluation. He asked Javadekar to take up the matter with the NAAC authorities to accelerate the process.

Launched by IIT-M, startup to help other startups

<https://timesofindia.indiatimes.com/city/chennai/launched-by-iit-m-startup-to-help-other-startups/articleshow/64362441.cms>



IIT Madras has incubated a startup to help the founders of other startups navigate uncharted terrain in the early stages of their ventures. The initiative aims to enhance the success of early stage startups using tools and techniques based on machine learning and data sciences.

YNOS Venture Engine CC Private Limited, a startup incubated at the IIT Madras Incubation Cell, was founded by Prof Thillai Rajan of the department of management studies who has been researching the Indian venture capital industry for close to a decade now.

Speaking about the venture, Rajan said information and decision-making analytics are not easily accessible for early stage entrepreneurs. “YNOS uses research insights and technology to provide information and intermediation services for early stage entrepreneurs. Using advanced marker analytics tools, our platform provides estimates of valuation and also identifies appropriate investors for the startup,” he said.

The technology platform and hybrid offerings have been designed to cater to specific needs of early stage entrepreneurs. This includes providing a competitive landscape for startups, valuation estimates, identifying investors and hands-on understanding of fundraising. The YNOS team comprises of faculty, students and alumni of IIT Madras.

The time has never been better for creating startups, said Rajan. However, startup mortality rates have not fallen, he noted, adding that while the funding landscape has expanded, it has also become more complex. “The proportion of startups getting funding is still low. These challenges continue to confound early stage entrepreneurs,” said Rajan.

Tamaswati Ghosh, chief executive officer, IIT Madras Incubation Cell, said, “As one of India’s leading incubators with over 140 startups, we are keenly aware of the challenges that by early stage technology entrepreneurs face, especially in raising investment and finding matched mentors,” adding that YNOS would address some of these critical issues.

Venture Intelligence founder Arun Natarajan, an investor in YNOS, said startups approaching professional investors for the first time tend to be underprepared.

“This causes a lot of delay in fundraising, if not completely derail it. By aiming to provide actionable information on this front, YNOS is poised to play an important role in making the early stage funding process in the country more efficient,” he said.

Monsoon rain may decline by 45% in long term, shows climate model made by Indian scientists

<https://theprint.in/science/monsoon-rain-may-decline-by-45-in-long-term-shows-climate-model-made-by-indian-scientists/63854/>



Patterns of low pressure systems over Bay of Bengal will slowly reduce in intensity and frequency, Indian researchers from 5 institutes have found.

An advanced climate model, developed by a group of Indian researchers from around the world, predicts an overall decline of 45 per cent in the monsoon rainfall in the long term, with severe repercussions.

In a paper published earlier this year in ‘Proceedings of National Academy of Sciences’ (PNAS), a leading scientific journal in the US, the team of scientists showed patterns of how low pressure systems that cause summer storms are formed.

The researchers came to the conclusion that in the long term, these systems, especially the ones that originate over the Bay of Bengal and dump moisture on land, will slowly reduce in intensity and frequency.

The model also shows these storms are slowly moving upwards in their sites of genesis, towards the poles, and will thus reduce overall summer precipitation in the country.

The team fed data into the newly developed model that forecasts summer climate patterns for the end of the century in India.

“Towards the end of the century, in the period 2070-2095, there is expected to be a 60 per cent decline in storms forming over the Bay of Bengal and about 10 per cent decline in the ones over land,” said R.S. Ajayamohan, one of the authors of the paper.

“And as the path of these systems shifts upward towards the poles, so does precipitation patterns on land,” the researcher added.

An overall decrease of 45 per cent in rainfall is to be expected, the paper says.

What are low pressure systems?

Low pressure systems form just the way tropical cyclones do. Over warm oceanic waters, the moist air gets warmed up and rises, creating a low pressure area below. Air from the surrounding high-pressure area rushes in to fill the void. This gets heated up in turn and rises, continuing the cycle. High above, water droplets in the moist air that cools form clouds.

This system of swirling and spinning clouds and wind grows in magnitude with the warmth and water from the ocean, causing cyclones.

However, during the monsoon, a phenomenon known as wind shear prevents cyclone formation. “A shear occurs when wind from a different and often perpendicular direction blows an existing system off course,” explained Ajayamohan.

“During the summer, strong westerlies (winds from the west towards the east) at about 1 km from the surface and easterlies at 10 km interfere with this moist air, bringing a large part of it on to land and dumping water there,” Ajayamohan added.

A similar mechanism works for dust storms that form over land as well, bringing in hot winds or loo.

As the birthplaces of these low pressure systems move towards the poles, so does the regions in which there is rainfall on land.

Researchers from five institutes — Center for Prototype Climate Modeling, New York University Abu Dhabi; Centre for Atmospheric Sciences, IIT-Delhi; Department of Earth and Planetary Science, University of California, Berkeley; Climate and Ecosystem Sciences Division, Lawrence Berkeley National Laboratory, Berkeley; and Centre for Climate Change Research, Indian Institute of Tropical Meteorology, Pune — contributed to the paper.

N/Core announces 8 tech start-ups for its non-profit incubation program

<https://www.livemint.com/Companies/XlzJ0TpppLMd9DsgZtHWhJ/NCore-announces-8-tech-startups-for-its-nonprofit-incubat.html>

N/Core is a tech incubator created in partnership with Cisco Systems, which focuses on solving social and economic problems using technology.



N/Core was founded by Atul Satija in early 2017.

Bengaluru: N/Core, a not-for-profit start-up incubator managed by the Nudge Foundation, on Monday announced the selection of eight early-stage companies for its six-month incubation programme, which offers a grant of Rs10 lakh to each graduating start-up.

N/Core is a tech incubator created in partnership with Cisco Systems, which focuses on solving social and economic problems using technology. The start-ups for the current cohort were picked from a pool of 713 applications, including from academic institutions such as IIT, IIM, UC Berkeley, Harvard Business School and London School of Economics, among others.

The eight early-stage start-ups in the current cohort work in diverse sectors, including education, employability, financial inclusion, healthcare, human rights, sanitation, and water, and their non-profit work ranges from remote villages, including Dankuni in West Bengal and Sadri in Rajasthan, to urban cities such as Delhi, Hyderabad and Bengaluru.

For instance, Intelhealth founded by Neha Goel, has developed a telemedicine platform, which allows health workers to remotely work with doctors in rural parts of India where access to healthcare is low.

Another start-up, Change with One Foundation, launched by Kiran Verma, is helping patients find blood donors by connecting them with the nearest source using a pre-populated database of existing blood donors. The platform claims to have connected over 2,000 patients across 11 countries till date.

Hyderabad-based Lakeer, co-founded by Dipika Prasad and Varun Pawar, works with state governments and municipalities to develop data-driven solutions for improving air quality, emergency response, healthcare, sanitation, and more.

In addition to the innovation grant of Rs10 lakh for each start-up, N/Core also offers guidance by a select set of mentors and technology experts, including industry veterans Sanjay Purohit, ex-chairman

of Infosys Consulting; Maneesh Dhir, former managing director of Apple India; K.R. Lakshminarayan, chief endowment officer of Azim Premji Foundation; and Ujwal Thakar, the former chief executive officer of Pratham and GiveIndia.

“As N/Core plans to focus on highly underserved thematic areas of poverty alleviation, we are looking for progressive, visionary partners such as Cisco to work with us and bring the required support for early-stage non-profits in the sector,” N/Core CEO Sudha Srinivasan said in a statement.

“Through this partnership with N/Core, we seek to inspire and empower a generation of global problem solvers who can combine tech know-how, ingenuity, and social consciousness to solve some of the most pressing social challenges,” said VC Gopalratnam, senior vice president for IT, Cisco India CSR.

N/Core was founded by Atul Satija in early 2017. In April, the incubator closed its first cohort under its non-tech programme, which included nine start-ups working on poverty-related solutions in India.

May 28

IIT-Delhi unhappy with naming of metro station as FIITJEE-IIT

<https://www.jagranjosh.com/trending/education-iitdelhi-unhappy-with-naming-of-metro-station-as-fiitjeeit-395087>

IIT-Delhi wants its name removed from the station if Delhi Metro is not in position to remove FIITJEE as the coaching has already got the naming rights of the metro station.



IIT-Delhi feels that the signage at the metro station is misleading

Indian Institute of Technology (IIT) has expressed its displeasure over use of its name along with FIITJEE, a coaching institute, from the upcoming metro station near its campus at the Safdarjung Development Area (SDA).

According to reports, IIT-Delhi feels that the signage at the metro station is misleading and making students think that they have entered into some kind of collaboration with the FIITJEE.

“The move has led to many alumni, and prospective students asking us whether we have entered into a collaboration with the coaching institute, which is not fair. We have now filed a writ petition in court and hope to get a favourable response,” V Ramgopal Rao, director of IIT-D, was quoted as saying by Hindustan Times.

The premier institute has now approached the Delhi High Court apart from taking up the matter with the DMRC, the human resource development (HRD) ministry and the urban development ministry

IIT-Delhi wants its name removed from the station if Delhi Metro is not in position to remove FIITJEE as the coaching has already got the naming rights of the metro station.

The Delhi Metro Railway Cooperation (DMRC) has been auctioning naming rights of metro stations since 2014 to generate some revenue.

Wipro 3D Signs an MoU with IIT Bombay Racing

<http://indiaeducationdiary.in/wipro-3d-signs-mou-iit-bombay-racing/>



Wipro3D, the additive manufacturing (AM) business unit of Wipro Infrastructure Engineering has signed a Memorandum of Understanding (MoU) with IIT Bombay Racing team to jointly explore the utilization of additive manufacturing technology for the fabrication of complex parts in a Formula Student electric race car.

As per the MoU Wipro 3D will contribute technical expertise on additive manufacturing as well as the equipment and material for the fabrication of parts while IIT Bombay Racing will provide the designs for the parts to be manufactured.

Mr. Ajay Parikh, Vice President and Business Head – Wipro3D, “Our partnership with IIT Bombay Racing is interesting and exciting. It is one of its kind in India. As per the MoU, critical metal components of this car will be 3D printed by us. We will fabricate multiple components.”

Formula Students (FS) is one of Europe’s most established educational motorsport competition, run by the Institution of Mechanical Engineers (IMechE). Teams from 110 European universities participated in the four days long event and is attended by 8000 students and 2000 professors from different universities across the globe. With over 1.2 lakh members in 140 countries, IMechE has been at the heart of Mechanical Engineering since 1847.

Kanishka Panda, Chief Mechanical Officer, IIT Bombay Racing, said, “In collaboration with Wipro 3D, we have built the first ever additively manufactured Titanium alloy automotive component in the

country. The part is a highly structurally loaded static component in the wheel of our new electric race car EVoX. With additive manufacturing and with the use of Titanium, 40% weight reduction has been achieved in the component, in addition to improvement in the ergonomics of the part.”

With a range of end-use applications successfully delivered in four years, WIPRO3D today offers standard and customized Additive Manufacturing solutions, products and services, to industries including Aerospace, Space, Industrial, Automotive, Healthcare, Oil & Gas and Heavy Engineering. Wipro3D has become a solution provider of choice to industry-leading organizations, added Mr. Parikh.

Fish scales inspire IIT Guwahati team to make membrane for cleaning oil spills

<http://www.catchnews.com/environment-news/fish-scales-inspire-iit-guwahati-team-to-make-membrane-for-cleaning-oil-spills-115150.html>



Fish scales have a typical structure and chemistry that makes them naturally capable of repelling oil.

Scientists are trying to exploit this property for developing novel materials that can find application in addressing oil pollution. The objective is to synthesize artificial interfaces that have oil repelling property or underwater superoleophobicity.

In this direction, a group of researchers at the Indian Institute of Technology (IIT), Guwahati, have developed a stretchable underwater superoleophobic membrane that can separate water from various forms of oil-contaminations.

The membrane can work in complex scenarios including extreme pH and temperatures, surfactant-contaminated water, river water, and sea water. It is able to separate oil repetitively from water even after 1,000 cycles of physical deformations.

The material has been designed by depositing a polymeric nano-complex on a polyurethane based stretchable fibrous substrate. The polymeric nano-complex was prepared by mixing a branched polyethylene polymer with penta-acrylate molecules. The polymeric nano-complex coated fibrous substrate was then modified with glucamine molecules to mimic the fish-scale wettability, explained Uttam Manna, leader of the research team, while speaking to India Science Wire.

Dibyangana Parbat, co-researcher, said the new material could help in taking care of waste water discharge from refineries and other oil-based industrial units and accidental oil spills. In addition, it

could also have biomedical applications. For instance, it could be used as an anti-bio-fouling coating on substrates such as catheter balloon.

The existing general approaches for synthesis of fish-scale mimicked interfaces are mostly based on depositions of polymeric hydrogels and metal oxides both of which are not durable in severe conditions.

“This work can find immense applications, and potentially create economic value,” commented, Thalappil Pradeep, professor of Chemistry at Indian Institute of Technology Madras, who was not connected with the study.

This study was financially supported by Science and Engineering Research Board (SERB), Department of Science and Technology. The results of this study have been published in Journal of Materials Chemistry A.

May 27

An air cleaner with potential

<http://www.thehindu.com/sci-tech/science/an-air-cleaner-with-potential/article24002809.ece>



IIT researchers develop a composite material that could help tackle pollution

A team of scientists led by researchers at the Indian Institute of Technology (IIT) Gandhinagar, Gujarat, has developed a nanocomposite material that can selectively convert environmental carbon monoxide into less toxic carbon dioxide. Carbon monoxide (CO) is a major air pollutant that poses a serious threat to health.

The new composite material is made of graphene and an alloy of platinum and palladium in the form of nanoparticles. In the project, graphene was used as a substrate and then “decorated” with alloy nanoparticles made of platinum and palladium. The novel catalytic structure was then used for selective oxidation of CO into CO₂. The use of a metal particle of certain orientation which absorbs or interacts with CO at lower energy helped the conversion.

“Once integrated, it is the size and shape of the nanoparticles that control the catalytic efficiency of the hybrid material. The efficiency of any catalyst depends on the availability of active sites and the surface area of nanoparticles. Therefore, engineering the morphology of alloy nanoparticles and their integration with graphene is critical to achieve catalytic performance,” said Dr. Chandra Sekhar Tiwary, a member of the research team at IIT Gandhinagar.

“While platinum and palladium, on their own, are active catalysts, alloying them with graphene does wonders. The hybrid has shown high adsorption and reaction due to synergism among the three,” Prof. Sudhanshu Sharma, also from IIT Gandhinagar, said.

The catalytic behaviour of the nanocomposite was studied using different morphologies for the oxidation of CO. The conversion rate varied along with the flow rate of CO as well as temperature, showing full conversion at temperatures ranging from 75° to 125°.

“These are initial results which are exciting. We are trying to build 3D porous architecture using such a hybrid for practical applications and at room temperature,” Dr. Tiwary said.

Potential applications

The new material could find potential use in chemical industries as well as environmental cleaning, the researchers said.

However, experts sound a note of caution.

“While the concept used is novel and important as CO is a major environmental problem, it may take a while for this science to be converted into technology because the experimental set-up appears complex and may not be commercially viable,” said Dr. Ramavatar Meena, a scientist at the Central Salt and Marine Chemicals Research Institute, Bhavnagar, Gujarat, who is not connected with the present study.

The study was done in collaboration with scientists from IIT Kanpur and the University of Campinas, Brazil. The team included S. Sreehala, R.S. Kumar Mishra, Sudhanshu Sharma and C.S. Tiwary (all from IIT Gandhinagar); M. Manolata Devi, N. Dolai, Krishanu Biswas (from IIT Kanpur); and Y.M. Jaques and Douglas S. Galvao (from the University of Campinas). The results have been published in *Nanoscale*, the journal of the Royal Society of Chemistry. — India Science Wire

Into the future: Fast, low-cost flying machine

<https://www.deccanchronicle.com/decaf/270518/into-the-future-fast-low-cost-flying-machine.html>

The travel time between any two destinations on the globe will take less than an hour in this new craft.



What's more, among the spin-offs of designing these hypersonic vehicles is the ability to equip India's next generation fighter jets with 'Stealth' capability to avoid detection by radars of adversaries.

Don't look now, but researchers at IIT-Bombay are setting up a novel "scholarly foundation" to design aircraft that fly more than five times the speed of sound, known among aerospace experts as 'Reusable Hypersonic Vehicles', and thus join the global race to realise such new generation jets. The research endeavour of Prof. Shripad Mahulikar and his team at aerospace department could well result in reduction in investments on development of these hypersonic aircraft as well as the operational costs. "Our research investigations are aimed at making a difference in the fundamental understanding and thinking of the aerothermal research community," says Prof. Mahulikar.

These hypersonic aircraft are billed as the "next big thing" in space and military aerospace across the world because of their ability to fly many times faster than sound and thus reduce the cost of expeditions into outer space or to shield cities from attacks of ICBMs (inter-continental ballistic missiles) or IRBMs (intermediate range ballistic missiles). They will be designed to cruise at altitudes exceeding 35 km, unlike long-distance commercial aircraft which fly at an altitude of about 11 km and less than the speed of sound.

What's more, among the spin-offs of designing these hypersonic vehicles is the ability to equip India's next generation fighter jets with 'Stealth' capability to avoid detection by radars of adversaries. There are, however, innumerable challenges in designing such RHVs, given their high speeds. To achieve hypersonic speeds, these vehicles need specialised engines, good management of heating caused by air resistance, and changes to the configuration design of the aircraft. Prof. Mahulikar's basic research findings on 'Aerothermal Considerations in Configuration Design of RHVs', provides clues and insights into cracking some of these challenges.

The airflow over an aircraft creates an aerodynamic drag force which resists the aircraft's forward motion. Aircraft wings are designed to minimise the air-drag which reduces the fuel consumed. Aircraft designers modify the aircraft geometry to achieve this with insignificant repercussions to its weight.

The aerodynamic drag also heats the aircraft's body and is known as aerodynamic heating. At hypersonic speeds, the aerodynamic heating can increase the vehicle temperatures to higher than 1,600°C. The designer's focus then shifts from designing just for aerodynamic drag reduction to designing for managing the harsh aerothermal environment. Studying and understanding the aerothermal environment for RHVs enables designing a reliable Thermal Protection System (TPS) the lifeline of hypersonic aircraft.

At speeds greater than sound a different drag comes into play (caused by the shock waves) and designers address this drag by incorporating a "sweepback" to the wings, i.e. a wing that angles backwards from where it is joined to the aircraft's body (fuselage). The angle at which the wing is "sweptback" varies from zero degrees (no sweep) for straight-winged low-speed aircraft to about 45 degrees and beyond for supersonic aircraft such as the fighter jets. The sweepback angle is designed to minimise aerodynamic drag and its value for minimum drag is the "drag-minimised sweepback".

Prof. Mahulikar proposed that due to aerothermal considerations, the sweepback angle of the lifting-body of hypersonic aircraft should be more than the drag-minimised value.

He also proposed a modification to the geometry of the leading edge. These new findings have important implications for the configuration design of RHVs. But how far are we from actually realising

a hypersonic flight? At least a few decades, admits Prof. Mahulikar, because of factors concerning safety and reliability.

May 26

IIT Guwahati: Disposable biosensor selectively detects alcohol

<http://www.thehindu.com/sci-tech/science/iit-guwahati-disposable-biosensor-selectively-detects-alcohol/article24000511.ece>



The sensor has short response time and can detect a range of concentrations, says Sharbani Kaushik.

The disposable biosensor offers an effective and portable alternative

There is a lot of interest now in developing biosensors that have short response time, selectivity and sensitivity. Researchers from IIT Guwahati have developed a paper-based biosensor that can detect ethanol. The short response time of about 10 seconds to detect ethanol and the range of concentrations to which the response was proportional make the biosensor particularly attractive.

With available hand-held devices such as breath analysers being non-specific, non-selective, requiring extra power sources, being expensive to fabricate and so on, cheap and effective biosensors become necessary. The research has been published in the journal ACS Applied Materials & Interfaces.

The team fabricated the device using chromatography paper and patterned anodic and cathodic zones on it. A silk-based nano-biocomposite layer was fixed in the anodic zone, and when it was half-dry, the team coated it with cyanobacteria — a group of photosynthetic bacteria. The bacteria could stay alive and conduct their metabolic activities because of the silk-based composite. “The miniaturised device allowed a decrease in response time to about 10 seconds,” says Dr Pranab Goswami of the Department of Biosciences and Bioengineering, IIT Guwahati, who led the study.

The cell membrane of cyanobacteria contains electron transfer proteins that can capture electrons from donors and transfer them to electron acceptors. When sprayed on the cyanobacterial layer, ethanol interacts with the cell membrane causing it to degrade and release the electron transfer proteins, which come in contact with the anode. They transfer electrons to the anode, causing a potential difference between the anode and the cathode. The researchers confirm that this potential surge increases with increase in the concentration of ethanol. Further, the response of the device to ethanol and methanol was markedly different. This selectivity was also established by the group.

The magnitude of the surge in potential when the device is sprayed with ethanol could be correlated with ethanol concentrations (0.001 to 20%). The device has a detection limit of 0.13%.

“The paper-based device is prepared in a disposable format and can be used only once,” says Sharbani Kaushik, who is at the Centre for Energy, IIT Guwahati and is the first author of the paper. The team plans to make the biosensor commercially available.

Graphene-based nanocomposite turns CO into CO₂

<https://www.graphene-info.com/graphene-based-nanocomposite-turns-co-co2>

Researchers at the Indian Institute of Technology (IIT), in collaboration with scientists from IIT Kanpur and the University of Campinas, Brazil, have developed a graphene-based nanocomposite material that can selectively convert environmental carbon monoxide into less toxic carbon dioxide.

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The catalytic behavior of the nanocomposite was examined using different morphologies for the oxidation of CO. The conversion rate varied along with the flow rate of CO as well as temperature, showing full conversion at temperatures ranging from 75° to 125°. “These are initial results which are exciting. We are trying to build 3D porous architecture using such a hybrid for practical applications and at room temperature,” Dr. Tiwary said.

The team stated that the new material could find potential uses in chemical industries as well as environmental cleaning. There is, however, a note of caution. “While the concept used is novel and important as CO is a major environmental problem, it may take a while for this science to be converted into technology because the experimental set-up appears complex and may not be commercially viable,” said Dr. Ramavatar Meena, a scientist at the Central Salt and Marine Chemicals Research Institute, Bhavnagar, Gujarat, who is not connected with the present study.