Scientists make ‘impossible material’ by accident

Forget To Turn Off Equipment, Produce World’s Most Efficient Water Absorber Cheaply

Tom Barden

It is so difficult to make that the research team first described it in the “impossible material” category.

Now, a century later, a team of Swedish scientists have made it possible by producing a substance known as Upsalite by accident, after leaving their equipment running over the weekend.

The breakthrough has far-reaching commercial applications, as Upsalite, named after the University of Upsala where it was originally discovered, is the world’s most efficient water absorber with potential applications for the removal of moisture in drug creation and high tech electronics, cleaning up huge spills.

A single gram of this elusive white, dry powdered form of magnesium carbonate (MgCO3) has an exceptionally large surface area of 800 square meters thanks to numerous nanoscopic pores, each one a million times smaller than the width of a human hair.

“Upsalite absorbs more water and has a higher humidity than the best material previously available and can be regenerated with less energy consumption than used in similar processes today,” said Maria Stranden, professor of nanotechnology at Upsala University.

“This, together with other unique properties of the discovered impossible material, is expected to pave the way for new spill and flood control. MgCO3 is also hard and dry as a material which can get a property which, combined with the huge active surface area that is maintained with particularly porous, makes it the world’s best buy. The unique feature of Upsalite, the ammonium carbonate (MgCO3) could only be produced in a process that is expensive and involves so much heat that it was not economically feasible to use it. The irony is that although the Upsala team had been trying to make the impossible material, they had been going about it the wrong way.”

“A Thursday afternoon in 2011, we slightly changed the synthesis parameters of the earlier employed unsuccessful attempts, and by mistake left the material in the reaction chamber over the weekend. Back at work on Monday morning, we discovered that a resinated liquid had formed and after drying this gel we started to get excited,” says Johan Cederwall.

The remaining solution still involved boiling the CO2 through the liquid mixture, but at three times normal atmospheric pressure. A year of detailed analysis and experimental fine tuning followed, during which time it was discovered that when heated to 90°C, the resulting gel solidifies and collapses into a white, solid, coarse powder. The findings have been published in the journal PLASONIC.
IIT-I to celebrate with a difference

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INDORE: In a society where Independence Day among the youth has got little to do with patriotism and more to do with the holiday associated with it, a social group called Avana comprising students from Indian Institute of Technology, Indore, comes with a difference. Organising programmes to commemorate this day, the group will be setting up libraries in two government schools of the city. The group is finding funds for their initiatives through a programme called ‘ORM’ - One Rupee Miracle, wherein everyone has to put in a rupee every day of the month. These students find ways and means to carry forward a series of programmes carving out the spirit of Avana - to help poor people.

Being run on the principle of generating smiles in the society, the organisation was started three years back by a third year student of the institute named Siddharth Duggriwala. Today, boasting a membership of 350 students, the organisation has continued to carry forward a series of programmes registering a social difference. “When I joined this group, I was adamant on making a difference to the society. Past two years, I feel contented with the work being done by our group,” said Yogesh Dorballaya, a third year computer science student.

Talking about the programmes being done by this group in the last two years, he adds, “We distribute blankets, organise cloth and blood donation camps and also visit government schools, where we teach students maths and science.” Ensuring that every month a special programme is done to mark the Independence Day celebrations, the group has previously distributed food, prepared by the students themselves, to poor people. “This year, our emphasis was more on contributing something which we can tend to in an elongated process. Beginning the endeavour with a small library of 50-100 books, we plan to take it forward so that students get enriched in a greater way,” said Alok Kumar, another student attached with the group.
IIT-G prof held for sending objectionable message

GUWAHATI: Lingaraj Sahoo, a professor at IIT, Guwahati was arrested by police for allegedly sending objectionable messages to a woman research scholar. He was later released on bail. Gautom Barua, IIT-G director said the arrest was made based on a FIR lodged by a woman scholar.
IISc only Indian institute in top 500 global ranking

Seethalakshmi | TNN

Bangalore: Bangalore-headquartered Indian Institute of Science (IISc) has once again made the country proud. It is the only Indian institute that has made it to the top 500 in the 2013 Academic Ranking of World Universities (ARWU) which was released by the Center for World-Class Universities at Shanghai Jiao Tong University. The 104-year-old entity is ranked in the 301-400 category.

IISc, which was ranked 45 in the world ranking for Chemistry last year, is on 43rd spot this time. The premier institute has shown a dramatic improvement in Computer Science as well. From 101-150 in 2012, it is now listed in the 51-75 bracket. In Math, however, it retained last year's ranking in the 151-200 slot. Harvard tops the global ranking, followed by Stanford and University of California, Berkeley. The Massachusetts Institute of Technology (MIT) and Cambridge University are in fourth and fifth position respectively, in the ARWU rankings.

Stanford tops in Computer Science, followed by MIT (97.8 score) and University of California (89.4). In Mathematics, it's Princeton University which is in numero uno position, followed by Harvard and University of California, Berkeley.

Harvard rules the roost in Physics, Chemistry and Economics. MIT and University of California, Berkeley, are the second and third best to study Physics, while University of California, Berkeley, and Stanford share the top three in Chemistry.
Only one Indian institute in the top 500 world universities

Aarti Dhar

NEW DELHI: India’s higher educational institutions have once again failed to find a respectable place in the world’s top 500 universities.

Bangalore-based Indian Institute of Science (IISc) is the only institution that figures somewhere between 300 and 400 as ranked by the Academic Ranking of World Universities (ARWU) for 2013.

American universities have captured 17 positions of the top 20 slots, with two going to the British universities and one being occupied by the Swiss Federal Institute of Technology at Zurich. Of the 500 universities ranked, American universities captured a total of 182 slots; European universities occupied 200 slots — but only three made the top 20. As many as 17 Chinese universities were included as well.

Harvard University has been described as the world’s best university with a score of 100; followed by Stanford University with a score of 72.6. University of California, Berkeley; Massachusetts Institute of Technology; and University of Cambridge have scored around 71 points.

The IISc has just about held on to its last year’s slot but improved its performance in the Departments of Chemistry and Computer Science. In the former, the Institute has jumped two ranks from 45 in 2012 to 43 this year and in the latter from a range of 101-150 in the past to 51-75 in 2013.

In Natural Science and Mathematics, and Engineering Technology and Computer Science, the score remains stagnant, ranging between 151-200 and 76-100 respectively.

ARWU, also known as Shanghai Rankings, considers every university that has any Nobel Laureates, field medallists, highly cited researchers, or papers published in Nature or Science. In addition, universities with significant amount of papers indexed by the Science Citation Index-Expanded (SCIE) and the Social Science Citation Index (SSCI) are also included. In total, more than 1000 universities are actually ranked, and the best 500 are published on the web.

Universities are also ranked by several indicators of academic or research performance, and the per capita academic performance of an institution. For each indicator, the highest scoring institution is assigned a score of 100, and other institutions are calculated as a percentage of the top score.
For new IIT, IIM faculty, the question: what will our spouses do?

When Professor Ashish Nanda—Robert Breachie Professor of Practice at Harvard Law School—agreed to take the top job at IIM-Ahmedabad recently, a critical factor that influenced his decision was the availability of a reasonably good job for his dentist-wife in the city. Dr Shubha Nanda, a leading dentist at Brookline, Massachusetts, a learnt to have done the rounds of the city with Prof Nanda, still found a suitable post in a Gandhinagar dental college.

The Nandas are not alone. Top institutes like IITs and IMEs are suddenly facing a new generation of faculty members who sign on the dotted line only after their spouses finds a decent job in the same city. And these are the ones who are quitting their jobs at these institutes because of the lack of opportunities for their spouses.

For instance, a management professor from IIT-Kanpur recently quit his job to join IIM-Curucona because he knew he could not find a suitable job in Kanpur.

The situation has serious implications for the new IITs and IIMs in smaller cities. So much so, that the union human resource development ministry has sought data from all IITs on faculty attrition.

Take the case of IIT-Dharmapuri, one of the eight new IITs that upped the IITA government in the last three years. 23 faculty members have relocated to bigger cities. Trends show that most of the faculty members left for established IITs that offer better professional opportunities.

Prof Gourishankar Mohra, chairman, board of governors, IIT-Dharampur, pointed out the challenges and working conditions there.

“Most of our young faculty members come with equally well-qualified work spouses, and they often fail to find jobs suited to their qualifications in smaller cities. This is an issue we need to address,” he said.

“We have 55 faculty members at present—most of them are young people. In 15 per cent of the cases, they are looking for jobs for their spouses as well. Many spouses come with PhDs and are set on working in a society to employ them whenever possible,” said Prof TA Gonsalves, IIT Mandi director.

“Recently, we could recruit a senior faculty member from the...”

From the FRONT PAGE

New IIT, IIM faculty ask: what will our spouses do?

US as her husband was setting up a business near Mandi. But on an average, one or two faculty members leave us every year due to lack of work opportunities for their spouses. We are in the process of setting up a research centre at IIT-Mandi so that entrepreneurial opportunities can be made available for spouses,” said Gonsalves.

At times, the couples face procedural roadblocks. Prof Baidurya Bhattacharya quit his job at the University of Delaware to join IIT-Kharagpur in 2005. But his doctor wife, Sangeeta, an MD from Johns Hopkins University, found it difficult to get permanent registration from the Medical Council of India, with the process dragging on for years.

“The problem of recruiting quality faculty and retaining them is faced by university administrations all over the world. This problem has become urgent in our generation since people have become more mobile, dual career couples are more common, and a highly educated assistant professor is very likely to have a highly qualified spouse these days,” said Prof Bhattacharya.

“A large educational institution can offer various employment opportunities to highly qualified spouses — as scientific officers, administrators, physicians, counsellors etc. The administration should not view the two-body problem as a liability but as an opportunity,” he added.

“In new IITs like in Ropar, Mandi, or even the older ones located in places like Kanpur, Kharagpur or Roorkee, there are limited employment opportunities. The solution is to create an enriching academic environment and bring soft options on the table,” said Prof S G Dhande, former IIT-Kanpur director. “We have created excellent infrastructure and are giving seed grants for research. In fact, among the new institutes we have the highest number of couples working on campus — as many as four qualified spouses,” said Prof M K Surappa, IIT-Ropar director.

“No longer is it just about a qualified spouse opting to teach at a nearby school. Now you have highly qualified spouses. We recognise that and are planning to set up a consultancy cell for them. We also encourage spouses to opt for PhDs at the institute and venture into entrepreneurial segments,” said IIM-Kozhikode director Prof Debashis Chatterjee.
New Delhi: Poor research output of students is considered one of the biggest drawbacks of Indian higher education. But government claims there has been a 49.27% growth in the number of research degrees (Ph.Ds) awarded by the Indian universities between 2006-09 and 2011-12.

In a reply in the Rajya Sabha, minister of state for human resource development Shashi Tharoor said in 2006-09, 10,781 Ph.Ds were awarded that increased to 16,093 in 2011-12.

There has also been a massive jump in India’s contribution to world’s research publications. Citing a report by the UNESCO Institute of Statistics, Tharoor said it increased from 25,000 in 2002 to 44,000 in 2007.

Despite the rapid strides in research, India is still way behind other nations. In the same period, the number of Ph.Ds in China increased from 14,706 to 48,112. Increase in Ph.Ds in the US was, however, marginal — from 40,024 to 41,464.

As for the contribution to the world publications UNESCO data shows that between 2002 and 2007, Brazil’s contribution increased from 16,000 to 29,000, Russia (31,000 to 32,000), China (62,000 to 1.94 lakh), the UK (93,000 to 1.25 lakh), the US (3.15 lakh to 3.58 lakh) and Japan (92,000 to 96,000).

Tharoor said the government has taken various steps for promotion and growth of postgraduate level studies and research. New institutions for science education and research have been set up. Universities are getting centres of excellence, new and attractive fellowships are on offer as well as there is emphasis on strengthening the infrastructure of Research & Development in universities. Tharoor said the HRD ministry had also set up a task force for rejuvenation of basic scientific research under M M Sharma. The task force has been converted into an empowered committee to implement its own recommendations.

In social sciences various research councils — Indian Council of Historical Research, Indian Council of Social Science Research and Indian Council of Philosophical Research — have been asked to fund more research initiatives.
SC moved for review of order against quota in speciality courses

NEW DELHI, DHNS: The government has approached the Supreme Court, urging it to reconsider its verdict against reservation of faculty posts in speciality and super-speciality courses in engineering and medical colleges like AIIMS, Delhi.

Filing a review petition on Wednesday, it claimed that the objective of social justice would be achieved only when a large number of reserved category candidates was brought into educational institutions and services.

The government also asserted its Constitutional mandate to make reservation policies. The petition was filed even as the government assured the Lok Sabha that it will consider bringing a constitutional amendment to nullify the apex court verdict.

A five-judge Constitutional bench led by then Chief Justice Altamas Kabir had on July 18 endorsed the views expressed in 1992 by a nine-judge Constitutional bench in the Indra Sawhney case, popularly known as the Mandal case, and said there had to be certain cases where merit alone would count.

The verdict emphasised that "the very concept of reservation implies mediocrity."

Questioning the decision, the Centre claimed that the verdict went against the mandate of the Mandal judgement, which did not prohibit reservation in any particular service, posts or hierarchy and left it to the government to formulate its policy.

It cited the ruling of the nine-judge bench, holding categorically that reservation in promotions is not permissible but reservation in direct recruitment is permissible at every level, i.e. from the lowest level to the highest provided the posts are filled through direct recruitment.