Dyed leaf diet yields colored silk

Cultivated silkworms have been spinning luxurious white silk fibers for use in clothing for thousands of years. Current dyeing practices produce wastewater with potentially harmful toxins, so scientists are turning to a new, “greener” dyeing method in which they coax already-colored fibers from the caterpillars by feeding them dyed leaves. Researchers dipped or sprayed mulberry leaves, the silkworm’s food of choice, with azo dyes to see which ones, when consumed, would transfer to the silk. Of the seven dyes they tested, three were incorporated into the caterpillars’ silk, and none seemed to affect the worms’ growth. Scientists noticed that certain dye traits, such as the ability to dissolve in water, affected how well the dye worked. “These insights are extremely important in development of novel dye molecules that can be successfully used in this green method of producing colored silk fabrics,” say researchers. www.acs.org.

Building better bricks with beer

Eduardo Ferraz and colleagues at the Polytechnic Institute of Tomar, Portugal, are mixing brewery grains into clay bricks to enhance their ability to trap heat without compromising strength. With a clay paste containing 5% spent grains, they created bricks as strong as conventional ones, while reducing heat loss by 28%. The grains make the bricks more porous so they trap more air, which increases heat retention. One downfall of the process is the smell. Bill Daidone of the Acme Brick Co., Fort Worth, Tex., says his lab abandoned experiments because the stench of the moist grains was overpowering. However, this problem vanishes once the bricks are fired, says Ferraz. Bricks that provide insulation without sacrificing strength could be a big boost to the construction industry, according to John Sanders, a scientist at the National Brick Research Center at Clemson University, S.C. http://portal.ipt.pt/portal/portal/international.

Researchers mix brewery grains into clay bricks to enhance their ability to trap heat without compromising strength.

What's the frizz about: New method indexes bad hair days

Beauty experts at Dow Corning, Midland, Mich., developed a verifiable Frizz Index testing method that quantifies hair’s frizziness independently of its volume. It represents a breakthrough that gives hair care manufacturers a tool to describe hair tress shape and appearance in a more accurate way, allowing them to formulate new products that will effectively tame frizzy, flyaway hair. “Dozens of frizz control products on store shelves tout their ability to tame unruly hair without unwanted side effects like influencing hair volume or leaving hair feeling greasy or crispy,” explains Sylvie Bouzéloc, Hair Care application designer. “Until now, manufacturers never had a way to prove a product’s ability to deliver on those claims apart from testing the product’s effect on volume. Our new Frizz Index will give them a way to demonstrate product performance to their consumers.” www.dowcorning.com/personalcare.

A verifiable Frizz Index testing method that quantifies hair’s frizziness independently of its volume was developed by Dow Corning researchers.
Specimen Name: adidas adiZero Prime SP track shoe with Cal Nano “Lone Star” spike

Vital Statistics:
The adidas Innovation Team and California Nanotechnologies (Cal Nano) worked together to create “the lightest and strongest track shoe in the world.” Originally designed for Olympic athletes, shoes are now available on the mass market.
Produced using computer-controlled multi-stage progressive cold forgers, the metal matrix nano composite (MMNC) spike is made of an advanced powder metallurgy composite comprised of micro- and nano-reinforcements embedded in a 6000 series aluminum matrix—a material substantially stronger, stiffer, and harder than aerospace aluminum alloys.

Success Factors:
The concept of building an ultra-light, nano-based track shoe originated from the “barefoot” running movement, with the goal of creating a way for athletes to experience the track as closely as possible without sacrificing performance.
With greater hardness, strength, and wear resistance than conventional steel alloys, the Cal Nano R&D team helped develop an enhanced spike one-third the weight of traditional designs. The nano spike is able to grip onto a thinner shoe, allowing runners to experience a barefoot sensation.

About the Innovators:
Integrating nanotechnology within the track shoe design occurred under the guidance of Mic Lussier, director of the adidas Innovation Team, to produce shoes for athletes at the Beijing and London Olympics. Based on several gold medal finishes, the technology was further optimized under the joint direction of Chris Melnyk, CEO of Cal Nano.

What’s Next:
Nanotechnology offers application possibilities across a range of industries due to its lightweight, high strength attributes. Automotive components are one example, as federal mandates dictate ever more stringent fuel economy standards. Another promising field is aerospace, with new nano-aluminum, titanium, and superalloys being developed for use in airframes, rocket engines, scram jet engines, and satellite systems.
Cal Nano is working with leading universities to develop advanced nano-titanium for use in biomedical implants and also produces nano-enhanced, carbide-based thermal spray powders and coatings for use in extreme environments such as down-hole applications in the oil and gas industry.

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