DOWNLOAD PDF SCIENCE CLOSE-UPS CRYSTALS

Chapter 1 : Close-ups of snowflakes win Lennart Nilsson Award

Dye crystals up close. Gledhill was so struck by the shapes the dye crystals formed, he immediately began to explore. Abandoning the yeast cells, he placed a droplet of dye on a slide, covered.

You would have to perform painstakingly difficult techniques with a state-of-the-art electron microscope that can resolve details less than 10 nanometers in sizeâ€”smaller than 10 carbon atoms lined up side by side, or 3, times thinner than a sharpened pencil line. At this level of magnification, the researchers were able to discern novel details about the building blocks of our bodily framework: The scientists saw mineral crystals just five nanometers in diameter unexpectedly twisting into and around these collagen strandsâ€”forming a helical structure. But this discovery, published Thursday in Science, remains mired in a decades-old debate about the complexities of bone at the nanolevel. Since the first electron microscopes turned their beams on bone in the late s, scientists knew it was primarily made up of bone mineral and collagen, a fibrous protein. But they have since argued about how these two constituents are organized relative to each other. Some researchers thought the mineral was mostly contained inside fibrils; others believed the mineral cladded the protein like armor. Reconstructed and rendered bone image. The researchers also prepared their bone samples in an unconventional way aimed at keeping intricate nanostructures intact. In his own research he has demonstrated that the predominant method, which uses a conventional bladed instrument for cutting, can shatter nanoscale bone features as it slices. For this study the researchers instead used a focused ion beam to slice bone into samples for microscope analysis. This, Schwarcz says, can mill out excruciatingly small and thin sections of bone without obliterating its atomic-size structures. The team managed to capture three detailed pictures of these carefully sliced, mineralized collagen fibrilsâ€”proteinâ€”mineral composite threads that make up most of our bones. Two of the images showed a pattern already familiar to nanoengineers and materials scientists working with bone: The third image, however, revealed a pattern nobody had ever reported seeing: Dark gray lines swirling into the center of closely packed hexagons with smaller, black hexagonal dots studded across them. Then they fed all of the images into a computer that reconstructed a 3-D model, called a tomogram, of the sample. This new model showed needle-shaped bone mineral crystals twisting into and around the collagen fibers, entangling them in a stiff, spiral scaffold. The resulting shape resembles a lot of fraying, hardened fibers woven into a flexible rope. In his research, Schwarcz says, he has never seen anything suggesting bone minerals are structured into curved, needle-shaped crystals. A body of literature based on a different imaging technique, called small-angle x-ray scattering, indicates bone nanocrystals are plate-shaped, he says. During the sample preparation, collagen fibrils contract from dehydrationâ€”and this may have stretched the crystals into a curved shape when they might have been straight in the body, Boatman speculates. But if the model turns out to be correct, it might help explain why our bones are so remarkably strong. Like a coiled spring, a helical structure can support greater loads before breaking compared with simple linear structures, she notes.

Chapter 2 : Beautiful Extreme Close-ups of Everyday Things

Core Strength: Extreme "Close-Ups" May Help Explain Why Our Bones Are So Strong. Snapshots taken at roughly ,x zoom reveal mineral crystals and proteins organize into twisting, helical shapes.

Tap here to turn on desktop notifications to get the news sent straight to you. Can you identify a photo of a dragonfly wing when you see it? Or tell a close-up of snowflakes from a satellite photo of deforested land? Just have a look at the amazing photos assembled by an unlikely duo at Salem State University in Salem, Mass. Stephen Young and biologist Dr. Paul Kelly have collected more than 50 such images for a joint exhibition at Salem and at Clark University in Worcester, Mass. How did the professors come up with the idea? Young told The Huffington Post in an email. Young said in the email. Also, there is nothing in the image to provide you with a measure of scale and so it is all shape and pattern. Shape and pattern do not define size. So how many do you think YOU can get right? A focus group identified less than 60 percent of the images correctly, according to Dr. Try guessing whether each image is macro or micro before peeking at the answer below. This is a close-up of the wing of a Green Darner dragonfly. This is a scanning electron microscope image of the surface of a piece of polished aluminum. This is a satellite image of North Africa. ISS astronauts snapped this photograph of deforestation in eastern Bolivia. This is a close-up of a crystal of sodium chloride, a. This is a satellite image of Western Australia. The ISS crew snapped this photograph of dune patterns in Algeria. This is an image of bone from an Atlantic Sturgeon. This is a false-color satellite image of sea-ice in the Weddell Sea. Reddish regions indicate thick ice. This is a satellite image of northern Siberia.

Chapter 3 : The Body - Scientific American

Book Pages. In one of the most beautiful projects I've seen in a while, artist Pyanek uses macro photography to show everyday things in astonishing detail. This is the first public release of.

Chapter 4 : 10 Amazing Close-Ups Show No Two Snowflakes are Alike Â«TwistedSifter

The Secret Life of a Snowflake has to be one of the most beautiful children's science books I've seen. The author, Dr. Kenneth Libbrecht, is a professor of physics and studies crystals. The author, Dr. Kenneth Libbrecht, is a professor of physics and studies crystals.

Chapter 5 : Close-ups of snowflakes win Lennart Nilsson Award | EurekAlert! Science News

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Chapter 6 : High-speed camera system catches close-ups of snowflakes in mid-air

SAY FREEZE Scientists used an imaging technique called cryo-electron microscopy to snap the first close-ups of lithium dendrites, revealing them as long, needlelike crystals.

Chapter 7 : Snowflake Machine Used To Make Ice Crystals In 'Cascades' Music Video | HuffPost

The Lennart Nilsson Award is the world's most prestigious distinction in scientific and medical photography, and is presented annually in honour of the legendary Swedish photographer.

Chapter 8 : What Is That? 10 Amazing Photos Show It Can Be Hard To Tell Close Up From Far Away | Hu

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High-speed camera system catches close-ups of snowflakes in mid-air. while the snowflake observation trials were funded by the National Science Foundation. form when snow crystals collide.

Chapter 9 : Close-ups of grain boundaries reveal how sulfur impurities make nickel brittle

Also on the site are more than of the magnet lab's 70, psychedelic close-ups of everything from liquid crystals to spinach and ice cream, many of which have been licensed for calenders, ties, and other tchotchkes.