U.S. DEPARTMENT OF ENERGY

Office of Science

COMMUNIQUE

9 December 2019

*Comm*unique provides a biweekly review of recent Office of Science Communications and Public Affairs work, including feature stories, science highlights, social media posts, and more. This is only a sample of our recent work promoting research done at universities, national labs, and user facilities throughout the country. *Please note that some links may expire after time.*

Communique will be taking a holiday break and will return Monday, January 6, 2020.

Arctic Snow Reflects Changing Climate

Long ago, people started using light colors for buildings and clothing to reflect the sun and keep cool. It's not a huge leap to compare this concept to one of Earth's primary cooling strategies—snow.

In the Arctic, this natural mode of climate control has been under duress for decades. Reflectivity—what atmospheric scientists call albedo—has been weakening, contributing to temperatures rising in the

Arctic more than twice as fast as anywhere else on the planet. Scientists suspected several forces at play, but they weren't sure which one was leading the charge.

Now, research led by Pacific Northwest National Lab points to the primary cause: a decrease in snow cover.

Click here to read more about the consequences of the reduction in Arctic snow cover.

NEWS CENTER

The Office of Science posted 60 news pieces between 11/24/2019 and 12/8/2019, including 24 university articles and 29 pieces from the labs and user facilities.

To help increase the U.S. supply of rare earth elements, a Critical Materials Institute team led by Livermore Lab is using microbe beads to recover rare earth elements (REEs) from consumer electronic waste. REEs are essential for technologies like solar and wind energy, advanced vehicles, and modern electronics. This new method could be used to recover REEs from end of life products.

A team led by Purdue University has built on success in removing the lignin barrier to solve other cellular obstacles. Their findings offer opportunities to significantly increase renewable biofuel production from crop waste products and biofeedstocks that could be grown on marginal lands.

Using neutron scattering at Oak Ridge National Lab, an international team has developed a metal-organic framework, or MOF, material that provides a selective, fully reversible and repeatable capability to capture a toxic air pollutant, nitrogen dioxide, produced by combusting diesel and other fossil fuels.

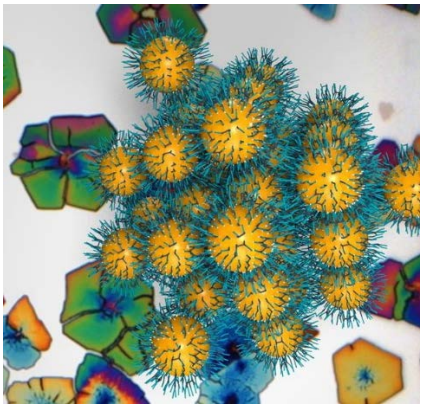
Chemists at the University of Pennsylvania have identified a new approach for purifying rare earth metals, crucial components of technology that require environmentally-damaging mining procedures, with the help of a magnetic field.

Protein-like molecules called polypeptoids have great promise as precision building blocks for creating a variety of designer nanomaterials. Scientists at Berkeley Lab have adapted a technique that enlists the power of electrons to visualize a soft material's atomic structure while keeping it intact, allowing them to "zoom in" on a polypeptiod's structure.

A team led by the University of Delaware is studying how cells use microscopic packages filled with information to communicate within plants, and between plants and pathogens, in hopes of unlocking new approaches to developing crops that are resilient to disease and other stresses.

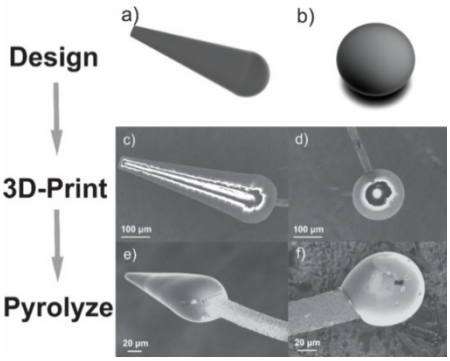
SCIENCE HIGHLIGHTS

The Office of Science posted eight highlights spotlighting two programs, BES and NP, between 11/24/2019 and 12/8/2019.



New research from Argonne National Lab shows how ligands, materials that bond particles together, affect key properties of superlattices. This discovery will help scientists better control properties of these superlattices, which may be useful in applications including sensors and solar cells.

A new 3D-printing method developed in part at Oak Ridge National Lab allows manufacturers to better customize carbon microelectrodes used as biomedical implants. These implants may be able to help improve biomedical devices for monitoring signals from the brain and nervous system.



The SNO+ experiment has made new measurements of the lifetime of the proton, how the flow of solar neutrinos changes over time, and the energy spectrum of those neutrinos. These observations allow scientists to probe interactions within the sun's core and put limits on processes predicted in some Grand Unified Theories.

IN THE NEWS

Forbes: Silicon Valley X-ray Laser Used To See Attosecond Electron Movement

Researchers at SLAC National Accelerator Lab have invented a way to produce bursts of x-rays that can see the movement of electrons on timescales of the order of billionths of a billionth of a second.

NextGov: Myth vs. fact: How a National Lab is Securing Electric Vehicles and Smart Cars of the Future
At Argonne National Lab, a holistic approach is accelerating discoveries and bolstering the fight against emerging transportation threats.

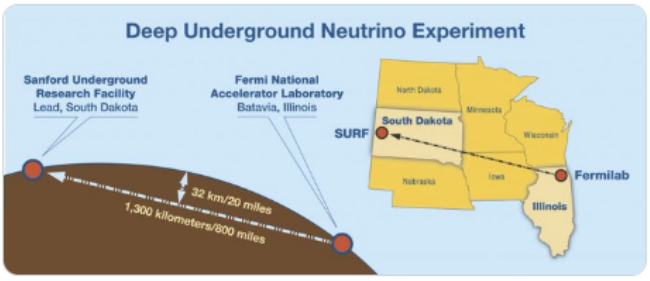
SciTech Daily: New Way to Identify, Manipulate Topological Metals for Quantum Information and Spintronics
A recent theory and modeling study from scientists at Argonne National Lab may not only give researchers an easier way of finding Weyl semimetals, but also a way to more easily manipulate them for potential spintronic devices.

TOP TWEETS

The Office of Science sent out 40 tweets between 11/24/2019 and 12/8/2019. Here are our two most popular from the past two weeks:

DOE Science
@doescience

Site preparation work for @DUNEscience begins this month. I'm proud that @ENERGY's @Fermilab will be hosting the biggest physics experiment on US soil, seeking to answer some of the universe's biggest questions -Director Chris Fall news.fnal.gov/2019/11/prep-w...



DOE Science
@doescience

The scientists at @ENERGY's national labs are asking the big questions. We're proud to introduce research from the 2019 DOE Office of Science Distinguished Scientists Fellows (from @BrookhavenLab, @argonne, @Fermilab, @BerkeleyLab) - Director Chris Fall energy.gov/science/articl...

BY THE NUMBERS

54th Edition of the TOP500

The world supercomputing rankings were announced in November at SC19, confirming U.S. leadership in high-performance computing. Four of the top ten fastest computers are supported by the Department of Energy, with Summit and Sierra ranked first and second.

END NOTES

The Big Questions: Recognizing the Scientists Behind the Discoveries

The Big Questions series features perspectives from the five recipients of the 2019 Distinguished Scientists Fellows Award describing their research and what they plan to do with the award. The first blog is an introduction to the series by the Director of the Office of Science, Chris Fall:

Big science requires big commitments. Thankfully, we here at the Department of Energy's Office of Science are all about the big ideas that push discovery forward.

That's why I was so pleased recently to recognize five researchers as our first group of DOE Office of Science Distinguished Scientists Fellows: Sally Dawson of Brookhaven National Laboratory, Ian Foster of Argonne National Laboratory, Joshua Frieman of Fermi National Accelerator Laboratory, Barbara Jacak of Lawrence Berkeley National Laboratory, and José Rodriguez of Brookhaven National Laboratory. Established by the America COMPETES Act, the program acknowledges the work of some of our most eminent scientists.

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