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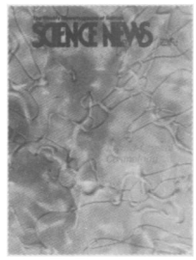
This Week

Research Notes

Articles

Cover: A defect tangle appears in a thin film of liquid crystal after a phase transition in which randomly oriented, rod-like molecules become aligned. Mismatches between regions with different alignments create a network of string-like defects. This type of laboratory system serves as an analog for defect-generating phase transitions that play key roles in certain cosmological theories. (Photo: B. Yurke)



Departments

Letters

Burning questions

In "Fresh smoke lowers nitrous oxide estimate" (SN: 3/2/91, p.134), researchers report that chemical reactions within stored air samples collected from the air above a forest fire generated nitrous oxide. They say this suggests that estimates of nitrous oxide emissions from the burning of biomass have been exaggerated.

Yet if the same chemical reactions that occur in the collection jars also occur in the environment after a forest fire, biomass burning may be contributing *more* nitrous oxide to the atmosphere, rather than less.

Patricia Shannon
Huntsville, Ala.

The researchers think the chemical reactions creating nitrous oxide in their experiments take place on the interior surfaces of the collection containers themselves. The walls of these containers act to bring sulfuric acid, water vapor and nitric oxide together to form nitrous oxide. The odds of these three molecules meeting in the air above a biomass fire are much lower than the odds of their meeting in a sealed container. The shape of the collection containers – typically long, narrow cylinders with a large surface-to-volume ratio – also gives these three molecules many opportunities to come in contact with a surface and to react with one another to form nitrous oxide. – T. Walker

Two separate problems seem intertwined in "Fresh smoke lowers nitrous oxide estimate." New sources of nitrous oxide have not been identified to account for the increasing concentration, and it appears that baseline sources also have not been completely identified.

As a volunteer rural firefighter, I have a suggestion for an unidentified baseline source: nitrogen compounds deposited by snow.

Grass fires are especially common in the spring. Part of the standard explanation for this is that winter snows deposit nitrogen compounds on the grass, making it much more flammable. Farmers also claim that the winter snows deposit nitrogen compounds in the soil to fertilize crops.

Such conditions exist over vast areas. Since the spring rains probably don't wash all of the exposed nitrogen compounds into the soil, and since sunlight might convert these unstable compounds into nitrous oxide, I wonder if this could be a cause of an unexplained seasonal variation in nitrous oxide.

Emmett Redd
Assistant Professor, Industrial Technology
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Springfield, Mo.

Astronomic acronyms

It's obvious that the acronym COSTAR was coined before the unfortunate title, Corrective Optics Space Telescope Axial Replacement ("Uncertainties surface over Hubble 'fix,'" SN: 3/2/91, p.142).

I have some better names for this package of corrective mirrors. How about Focus Optics Repair (FOUR-EYES), Updated Hubble Optics (UH-O) or Focus Improvement in Xtremely Inaccessible Telescope (FIXIT)?

Al Pergande
Orlando, Fla.