Licensable Technologies

nanoFOAM

2005 WINNER

Applications:

Our nanofoams could improve the efficiencies of

- the catalytic production of ammonia, sulfuric acid, fuels, plastics, solid shortening, and many other chemicals and products,
- oil-refining processes,
- electrical generation from fuel cells that run on hydrocarbons,
- silver biocidal filters that destroy liquid- or airborne germs or bioweapons on contact,
- solid and liquid-monopropellant rocket fuels, and
- targets for inertial-confinement-fusion experiments.

Our nanofoams could also

- improve the strength and heat-transfer properties of jet-turbine blades while decreasing their weight,
- reduce the emissions of nitrogen oxides from internal combustion engines and coal-fired power plants,
- remediate chlorohydrocarbons in the environment,
- enhance the sensitivity of biomedical detectors, and
- serve as electron sources for plasma TVs and as radar-absorbing materials

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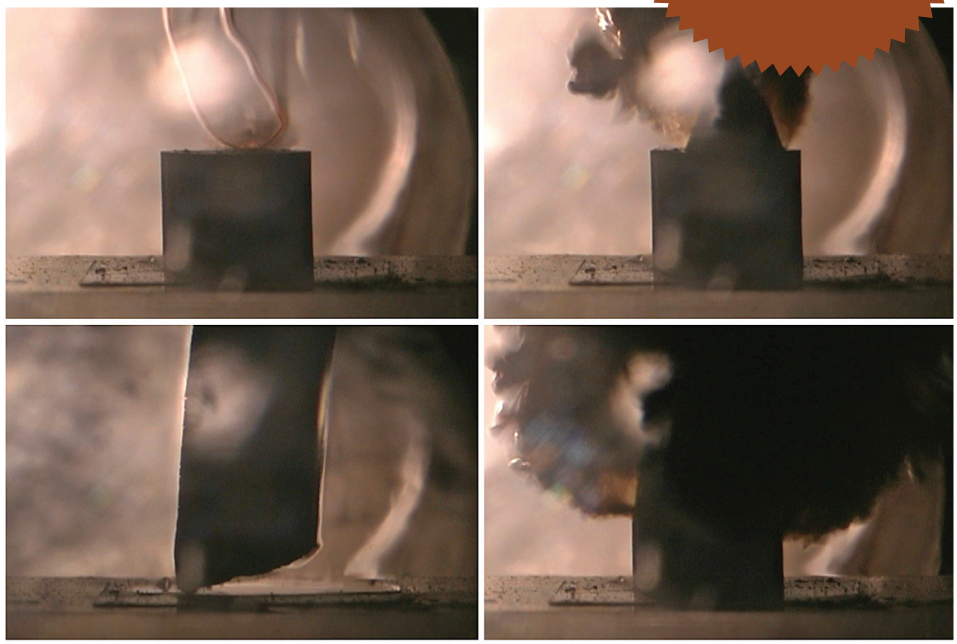

In the upper left frame, the slanted U-shape with the bright spot is a resistively heated wire igniting a pellet pressed from one of our high-nitrogen transition-metal complexes. (The spot is a reflection from the window of the experimental chamber.) As the pellet rapidly burns, its volume dramatically increases as nitrogen gas released by the combustion creates nanoscopic pores in the coalescing metal particles that are also released.

Summary:

Our nanoFOAM technique produces self-supporting, nanoporous metal foams. We produce a nanofoam by igniting a pressed pellet of one of our special compounds in an inert atmosphere. The compounds are high-nitrogen transition-metal complexes synthesized with a low-cost, high-volume method we have developed. To date, we have produced nanofoams of iron, cobalt, copper, and silver. We expect to produce nanofoams of many of the more than 60 transition metals in the periodic table. The nanofoams have pore diameters of 20 nanometers to 1 micrometer, surface areas as high as 258 meters-squared per gram, and densities as low as 0.01 gram per cubic centimeter. These values compare favorably with those of silica aerogels, the lightest known solids.

Development Stage:

Reduced to practice, seeking partners to develop applications.

Patent Status:

Patent pending

Licensing Status:

Available for exclusive or non-exclusive licensing

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