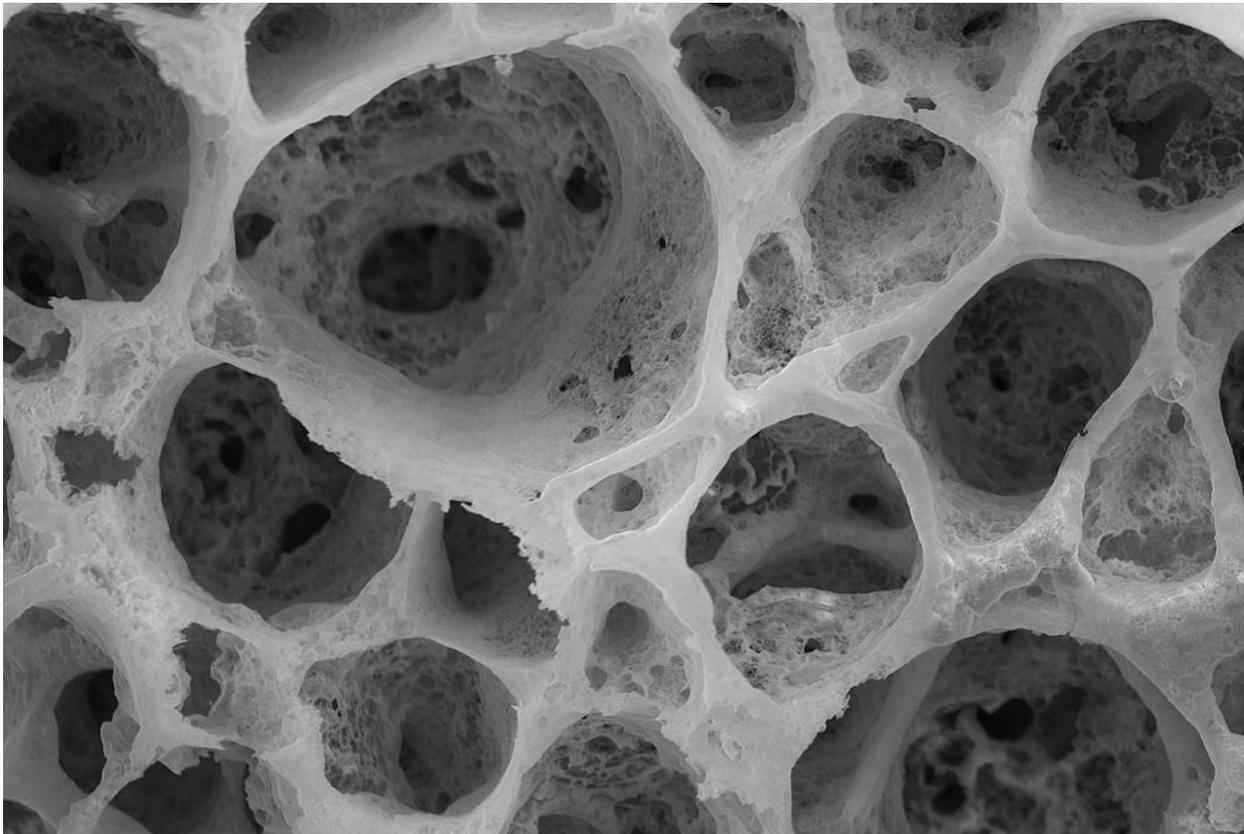

Picture of the Week: Fuel from the fire

June 12, 2015



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Combustion synthesis is a technique being investigated by Los Alamos researchers to create new nuclear reactor fuel materials. It essentially means burning a material to create a new chemical form with different properties. The Lab's goal is to create new materials for use in advanced nuclear fuels which are safer and more efficient than those currently burned in reactors. The image shown here was created by a Scanning Electron Microscope (also called an SEM) and it shows a cerium nitride foam that was created from just such a combustion reaction.

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Some of the compounds Los Alamos is studying are called "f-element metal nitrides," and they combine nitrogen with one of the actinide or lanthanide metals that are found at the bottom of the periodic table. In the past, actinide nitrides have been notoriously

difficult to create. However, using this technique, the team discovered that their new nitrogen-rich precursor materials (that contain a f-element metal and a large amount of nitrogen) burn in a controlled environment without oxygen. This burning creates a significant volume of high-purity f-element metal nitride “foam.” The high surface area and high purity of the material is of great interest to researchers. The team (which includes researchers from C, M, and T divisions) has recently used this technique to create uranium and thorium materials as well.

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