



## Zeolite-like Metal Organic Frameworks (ZMOFs)

**R**esearchers at the University of South Florida have developed a methodology for the design and manufacture of a new class of materials which adopt zeolite net-like topologies. This technology uses readily available materials and allows for the rational design of both known and completely unprecedented zeolite-like topologies.

Zeolites, a \$350 billion a year industry, are purely inorganic microporous crystalline solids constructed from tetrahedral building units sharing corners. Typically they are composed of silicon or aluminum and oxygen, and have cavities with well defined shapes and sizes that cannot be adjusted or changed chemically. With this technology not only can we adjust both the dimensions and chemical environment of the cavities, but we can do so in a rational manner and can match desired physical and chemical properties with prescribed applications.

### Advantages over purely inorganic zeolites:

- Big market opportunities in hydrogen storage, catalysis, ion exchange, and separations
- Cheap, readily available molecular components
- Allows for the fine-tuning of channel and cavity sizes and shapes
- Allows for the introduction of organic functionality into the framework not possible in inorganic zeolites
- Allows for the introduction of Transition and Lanthanide metals along with their various properties

Customized zeolite topologies,  
by cavity dimensions and organic  
functionality...

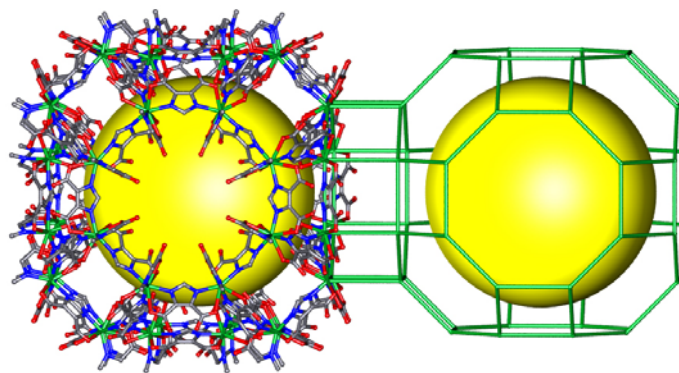
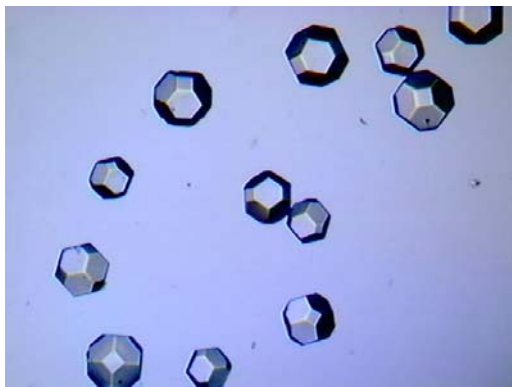


Figure: Optically magnified digital image of single crystals (left) . Model of one zeolite-like framework demonstrating framework cages (green), void space (yellow sphere), and organic functionality (right).

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