New zeolite is discovered

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A Spanish-led team of geologists has reported discovering a porous material with a new, highly open framework structure.

The material found by Avelino Corma and colleagues from the Politecnica University of Valencia is a zeolite, one of a family of materials also known as molecular sieves.

The researchers say the new material exhibits pore systems running in two different directions -- one pore system has extra-large pores (12.2 angstroms) connected crosswise by the second pore system, which has medium-sized pores (6.1 angstroms by 4.3 angstroms).

Zeolites are used in industry to catalyze important reactions, to store and separate gases, and to remove contaminants. The new material, called ITQ-33, has a very high storage capacity and its large pores allow unusual catalytic activity.

In some combinations, the researchers said, the cracking of gas and oil is better when catalyzed by ITQ-33 than by zeolites currently used commercially.

Corma, along with Raul Lobo of the University of Delaware, discovered the unusual conditions needed to synthesize the material using high-throughput techniques that allow chemists to sample a wide range of possible synthesis conditions.

The study appears in the current issue of the journal Nature.