

W0140

Molecules Obtained from the Organic Solid State as Building Units of Metal-Organic Frameworks.

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We have described a method to construct molecules in the solid state using molecules that function as linear templates. The templates are small molecules that juxtapose stilbenes in arrangements suitable for single and multiple [2+2] photodimerizations. The templates assemble the stilbenes by way of hydrogen bonds. The templates act hydrogen bond donors and the stilbenes act as hydrogen bond acceptors. The hydrogen bond donors have thus far been –OH and –CO₂H groups while the hydrogen bond acceptors have been pyridyl groups. In this context, we believe that molecules derived from linear templates in the solid state may be used as intriguing ligands in coordination chemistry. The cyclobutanes possess at least two divergent pyridyl groups, which means that the molecules may serve as organic building units of metal-organic frameworks. In this presentation, we describe the design and synthesis of metal-organic frameworks, as well polygons and polyhedra, obtained from molecules constructed in the solid state using linear templates. These frameworks represent rare applications of molecules obtained from linear templates and the solid state.