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(54) **ISORETICULAR METAL-ORGANIC FRAMEWORKS, PROCESS FOR FORMING THE SAME, AND SYSTEMATIC DESIGN OF PORE SIZE AND FUNCTIONALITY THEREIN, WITH APPLICATION FOR GAS STORAGE**

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(58) **Field of Search** ..... 556/43, 46, 51, 556/58, 72, 89, 112, 113, 136, 141; 534/15

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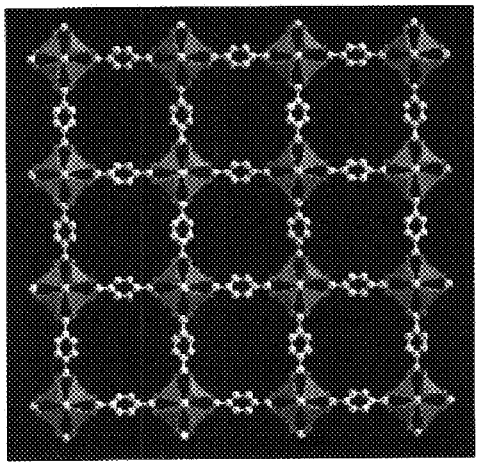
(57) **ABSTRACT**

An isoreticular metal-organic framework (IRMOF) and method for systematically forming the same. The method comprises the steps of dissolving at least one source of metal cations and at least one organic linking compound in a solvent to form a solution; and crystallizing the solution under predetermined conditions to form a predetermined IRMOF. At least one of functionality, dimension, pore size and free volume of the IRMOF is substantially determined by the organic linking compound.

**62 Claims, 55 Drawing Sheets**

**(10 of 55 Drawing Sheet(s) Filed in Color)**