

EXCEPTIONAL ZEOLITIC IMIDAZOLATE FRAMEWORKS AND A GENERAL STRATEGY TO MAKE MORE

Tech ID: 25486 / UC Case 2016-049-0

PATENT STATUS

Country	Type	Number	Dated	Case
United States Of America	Issued Patent	10,821,417	11/03/2020	2016-049

BRIEF DESCRIPTION

This invention discloses a new class of materials known as Zeolitic Imidazolate Frameworks (ZIFs). These multivariant ZIFs are composed of transition metal ions (such as Zn or Co) connected by imidazolate linkers in a tetrahedral arrangement, forming three-dimensional crystalline structures. The invention includes methods for synthesizing these ZIFs, enabling precise control over their structural properties, and explores their use in various advanced applications.

SUGGESTED USES

- **Gas Separation and Storage:** ZIFs can selectively adsorb gases like CO₂, CH₄, H₂, and noble gases, making them ideal for efficient gas separation and storage.
- **Catalysis:** The unique structure of ZIFs can be tailored to enhance catalytic activity, offering improved performance in chemical reactions.
- **Light Harvesting:** ZIFs can be used in photovoltaic devices and other light-harvesting applications due to their ability to organize light-absorbing molecules in a precise manner.
- **Meta-materials:** The ordered superlattices can be utilized to create meta-materials with unique optical, electromagnetic, and mechanical properties.
- **Chemical Sensing:** Enhanced surface area and selective pore environments make ZIFs suitable for detecting various analytes.

ADVANTAGES

- **Programmable Functionality:** Integration of distinct ZIF types in a single material allows for multiple, co-localized functions.
- **High Surface Area and Porosity:** Maintains intrinsic ZIF characteristics while introducing long-range order.
- **Enhanced Selectivity and Performance:** Synergistic effects between ZIF domains improve adsorption, catalysis, and sensing.
- **Scalable Synthesis Methods:** Compatible with bottom-up fabrication techniques and modular assembly.

CONTACT

Laleh Shayesteh
lalehs@berkeley.edu
tel: 510-642-4537.



INVENTORS

» Yaghi, Omar M.

OTHER INFORMATION

CATEGORIZED AS

- » **Energy**
- » Other
- » **Materials & Chemicals**
- » Chemicals

RELATED CASES

2016-049-0

- Tailored Optical and Electronic Properties: Superlattice ordering enables design of materials with tunable photonic or electronic responses.

RELATED MATERIALS

ADDITIONAL TECHNOLOGIES BY THESE INVENTORS

- ▶ [Coordinative Alignment Of Molecules In Chiral Metal Organic Frameworks](#)
- ▶ [Hydroxamate-Based Metal-Organic Frameworks](#)
- ▶ [Mof Heterolites: Mesoscopic Heterogeneity Within Order With Porous Nanocrystals](#)
- ▶ [PFAS Removal from Water Through Fluorinated Cationic Reticular Materials](#)
- ▶ [Sorption-Based Atmospheric Water Harvesting Device](#)
- ▶ [Molecular Weaving Additives To Enhance The Mechanical Properties Of Materials](#)
- ▶ [Hydrochromic Reticular Materials](#)
- ▶ [Thiazole-Based Covalent Organic Frameworks For Low-Humidity Water Adsorption](#)



University of California, Berkeley Office of Technology Licensing

2150 Shattuck Avenue, Suite 510, Berkeley, CA 94704

Tel: 510.643.7201 | Fax: 510.642.4566

<https://ipira.berkeley.edu/> | otl-feedback@lists.berkeley.edu

© 2025, The Regents of the University of California

[Terms of use](#) | [Privacy Notice](#)