

HYDROCHROMIC RETICULAR MATERIALS

Tech ID: 34525 / UC Case 2026-089-0

PATENT STATUS

Patent Pending

BRIEF DESCRIPTION

Monitoring humidity and water vapor levels in industrial and consumer settings often requires electronic sensors or integrated chemical dyes that can be prone to failure or degradation. To simplify this process, UC Berkeley researchers have developed hydrochromic reticular materials that integrate color-changing functionality directly into a porous adsorbent framework. These materials consist of a metal-modified reticular structure where color transitions are intrinsically coupled to the adsorption and desorption of water molecules within the porous architecture. By providing a direct visual response based on the material's internal hydration state, this technology enables robust, real-time monitoring of water vapor without the need for external electronic components, separate indicators, or complex power sources.

SUGGESTED USES

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Industrial Desiccants: Providing an intuitive visual cue to signal when a desiccant is saturated and needs regeneration or replacement.

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Smart Packaging: Integrating humidity indicators into food or pharmaceutical packaging to ensure product integrity during shipping and storage.

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Climate Control Systems: Enhancing HVAC monitoring with passive, color-coded indicators for ambient humidity levels in sensitive environments.

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Protective Equipment Storage: Monitoring the moisture levels in storage containers for sensitive electronics or aerospace components.

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Environmental Monitoring: Using the materials as simple, low-cost sensors for field studies tracking water vapor dynamics in various ecosystems.

ADVANTAGES

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Integrated Functionality: Combines moisture adsorption and visual sensing into a single material, eliminating the need for separate sensors or dyes.

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Energy Efficiency: Operates as a completely passive system, requiring no electricity or battery power for monitoring.

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Intrinsic Coupling: The color change is directly linked to the adsorption state, ensuring high reliability and accuracy of the visual indicator.

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Robust and Simplified Design: Reduces the complexity and cost of moisture-monitoring systems by removing electronic vulnerabilities.

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INVENTORS

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OTHER INFORMATION

CATEGORIZED AS

» **Environment**

» Other

» Sensing

» **Materials & Chemicals**

» Chemicals

» Other

» **Sensors & Instrumentation**

» Environmental Sensors

RELATED CASES

2026-089-0

Reversibility: The framework maintains its hydrochromic properties over multiple adsorption-desorption cycles, offering a long-lasting and sustainable solution.

RELATED MATERIALS

ADDITIONAL TECHNOLOGIES BY THESE INVENTORS

- ▶ [Coordinative Alignment Of Molecules In Chiral Metal Organic Frameworks](#)
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- ▶ [Hydroxamate-Based Metal-Organic Frameworks](#)
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