# TECHNOLOGY OFFER

## NOVEL STRATEGY FOR DESIGNING HIGHLY WATER-STABLE METAL-ORGANIC FRAMEWORKS FOR ENHANCED WATER PURIFICATION

Metal-organic frameworks (MOFs) have emerged as promising materials for various industries, but their low structural stability in water has hindered their use in many applications such as water purification. Addressing this pivotal challenge, researchers at TU Wien have developed a new strategy to significantly improve the stability of MOFs in liquid phase. The innovation is expected to further widen the application possibilities of MOFs and create new opportunities for numerous fields.

### BACKGROUND

Metal-organic frameworks (MOFs) are a class of compounds with fascinating characteristics including their ultrahigh porosity and the highest known internal surface area. The extraordinary properties of MOFs make them suitable for a wide array of applications ranging from catalysis and membrane technologies to sensors and drug delivery systems — just to mention a few examples.
The properties of MOFs can be tuned by varying the types of the inorganic and organic components in their structure. MOFs typically have a good chemical and thermal stability. However, their poor stability in aqueous environments has until now severely limited their use in liquid phase applications such as water purification.

### TECHNOLOGY

The technology enables the preparation of novel mixed-coordination MOFs with exceptional water stability. The improved properties are achieved through strategic modification of the MOFs' structure without compromising their intrinsic porosity and functionality.

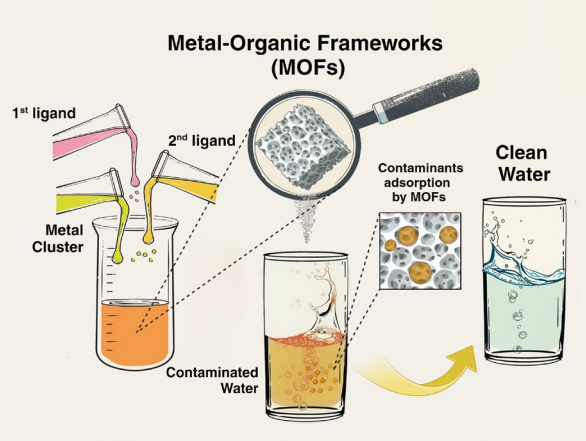


FIGURE (above): Simplified illustration of the preparation of the novel MOFs and their application in water purification. ©TU Wien

### ADVANTAGES

- Extended stability: Framework stability of MOFs improved from a few days to at least 1 year in aqueous environments.
- Minimized degradation: Notable reduction in leaching and corrosion.
- Maintained functionality: The intricate pore structure and active sites remain intact and fully accessible.

**REFERENCE:**
*M037/2021*

**DEVELOPMENT STATUS:**
TRL 4

**APPLICATIONS:**
Water purification,
Photocatalysis, Electrocatalysis,
Membrane technologies for adsorption and separation,
Sensors

**KEYWORDS:**
Metal-organic frameworks,
MOFs,
Water-stable MOFs

**IPR:**
AT application filed
PCT application filed

**OPTIONS:**
R&D cooperation, Development partnership, License agreement

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