



One-step water recycling for inorganic and organic pollutants

R&D RESULT

Patent

Knowledge Area

- Inorganic/Organic Chemistry
- Water recycling
- Environment

Collaboration

- Technology available for licensing
- Other collaborations

Ref.

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MULTIVARIATE METAL-ORGANIC FRAMEWORKS CONSISTING OF TWO DIFFERENT METALS AND OXAMIDATE LIGANDS AND THEIR USE AS A SIMULTANEOUS ADSORBENT OF INORGANIC AND ORGANIC POLLUTANTS

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Background: One of the most serious environmental problems that modern society has to deal with is the pollution of aquatic systems. In fact, the scale of the problem is so huge that the United Nations Sustainable Development agenda sets access to pollution-free flowing waters as one of its main objectives.

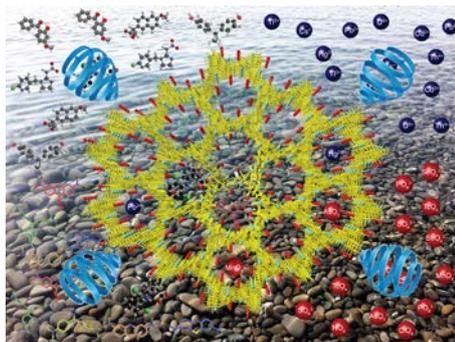
The pollutants present in water are usually classified into inorganic and organic pollutants according to their chemical nature. Existing water recycling technologies (precipitation, coagulation/flocculation, membranes, biological processes, advanced oxidation processes and adsorption into active carbons, zeolites, polymer resins, bio-adsorbents and clays) are not efficient in collecting both types of polluting agents simultaneously. The methods used until now have a great specificity that makes it necessary to apply different steps in sequence for effective removal of environmentally and living beings health harmful pollutants, so any invention that reduces the number of steps and increase the efficiency of the process, it would be highly interesting.

The invention: A research team from the Universitat de València, together with the Università della Calabria has developed a new material that eliminates in a single step pollutants of different nature, inorganic and organic. In this way, it avoids the multi-step sequential protocols that are currently applied in water recycling plants. Specifically, the Multivariate Metal-Organic Frameworks (MTV-MOFs) presented in this invention are made up of two different oxamate-based precursors derived from two natural amino acids with different residues. It allows the adsorption in a single step of inorganic and organic pollutants present in water.

Applications: The materials presented are relevant for the recycling of waters contaminated with pollutants of diverse nature, both inorganic and organic. It would be of interest in water recycling plants from industry (pharmaceutical, textile, food, plastic, mining...), as well as agricultural and domestic use.

Advantages: The main advantages offered by the invention are:

- One-step water recycling for inorganic and organic contaminants.
- Possibility of reusing materials.
- Saving time and resources.
- High degree of specificity for the capture of the desired contaminant.
- Economic cost of the materials, being also highly stable and respectful with the environment.



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