Paramagnetic Aerogels based on Coordination Polymers with biological interest ligands

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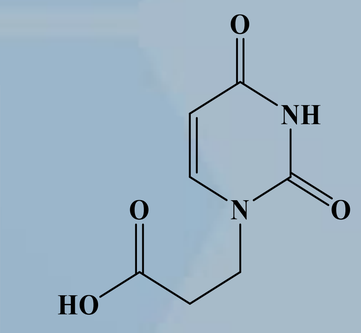
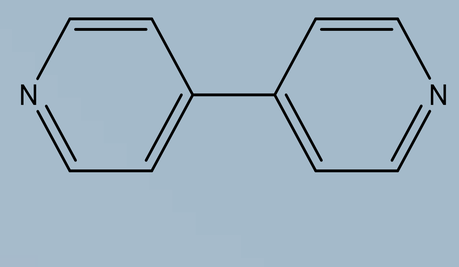
SUPRAMOLECULAR GELS BASED ON COORDINATION POLYMERS

In this work, METAL-ORGANIC GELS (MOG) are formed by self-assembling mechanisms of Cu(II) METAL IONS (nodes) and DNA MODIFIED NUCLEOBASES (ligands), creating 3D nano-architectures thanks to the MOLECULAR RECOGNITION ability. In these colloidal systems, liquid phase can be removed by its drying with SUPERCRITICAL CO_2, preserving the pores and forming the METAL-ORGANIC AEROGEL (MOA).[1] These materials will be endowed with synergistic properties, such as structural flexibility, crystallinity, magnetism or stimulus-response. [2] Due to the characteristics of our material, we have adsorbed volatile substances such as IODINE (disinfectant) [3] in order to RELEASE it in a controlled way, and we have designed an HPLC COLUMN using it as stationary phase to try enhancing the selectivity in analytical techniques .

METAL IONS AND NUCLEOBASES AS BUILDING BLOCKS SYNTHESIS



Uracil-1- propionic acid (UPrOH)



4,4- Bipyridine (4,4- bipy)

Cu(II)

Copper(II) salt

2:2:1 WATER

SUPRAMOLECULAR GEL FORMATION

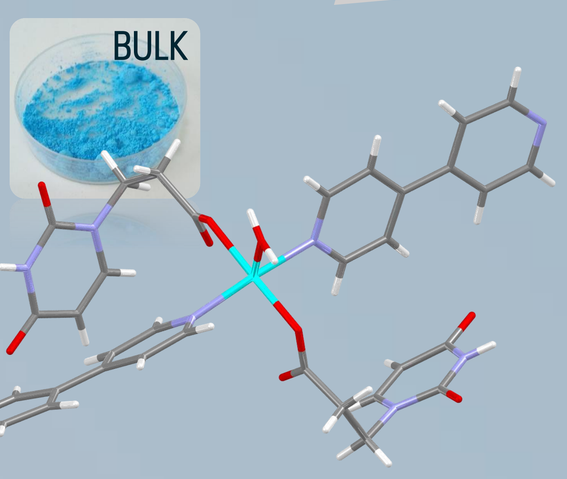
POLIMERIZATION

VIA TOP-DOWN

METAL-ORGANIC GEL (MOG)

i) 70 µL AcOH + 4 mL MeOH
ii) 15' Sonication + 45 ºC

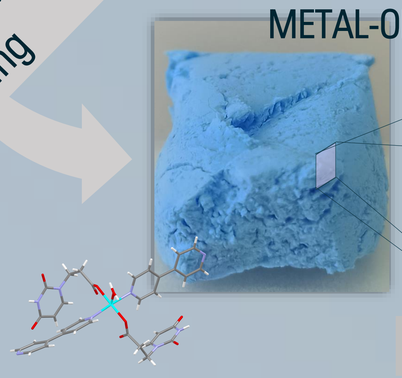
BULK

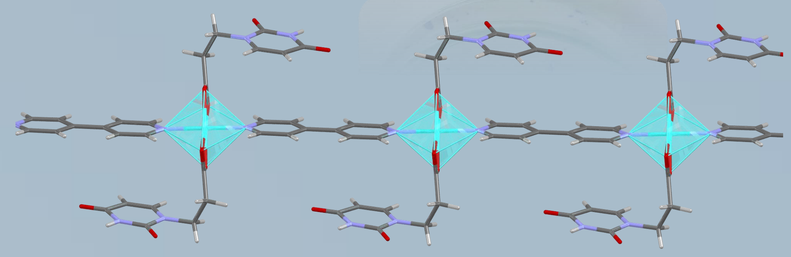


Methanol, Δ

Supercritical CO_2 Drying

METAL-ORGANIC AEROGEL (MOA)





PARAMAGNETIC

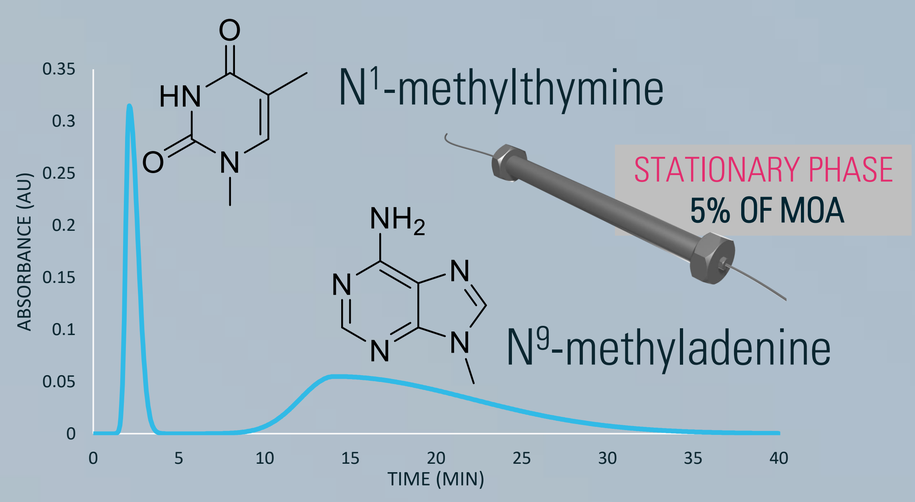
PARAMAGNETIC

ANTIFERROMAGNETIC

AEROGEL Vs BULK

Porous, even if starting compound is not	Mechanical and rheological properties; nanoprocessable
Different pore sizes	It is conserved Inherent bulk material properties like stimulus-response
Low density	

APPLICATIONS HPLC COLUMN



APPLICATIONS I_2 CAPTURE- DELIVERY

[1] Vegas, V.G. et al., Nanoscale, 2020,12, 14699-14707. [2] Vegas, V.G., Maldonado, N., et al.; J. Inor. Biochem., 2019, 200, 110805. [3] Maldonado, N., Amo-Ochoa, P; Dalton Trans., 2021, Accepted Manuscript https://doi.org/10.1039/D0DT04066E

References