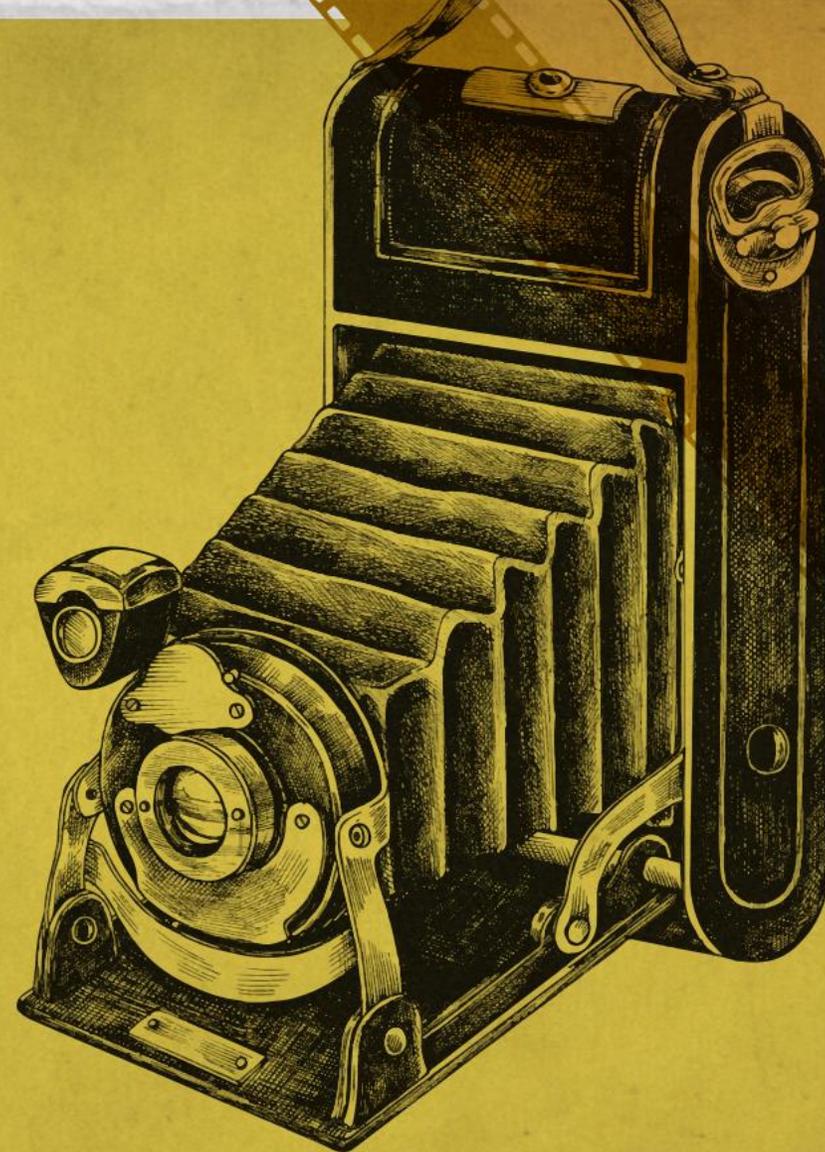
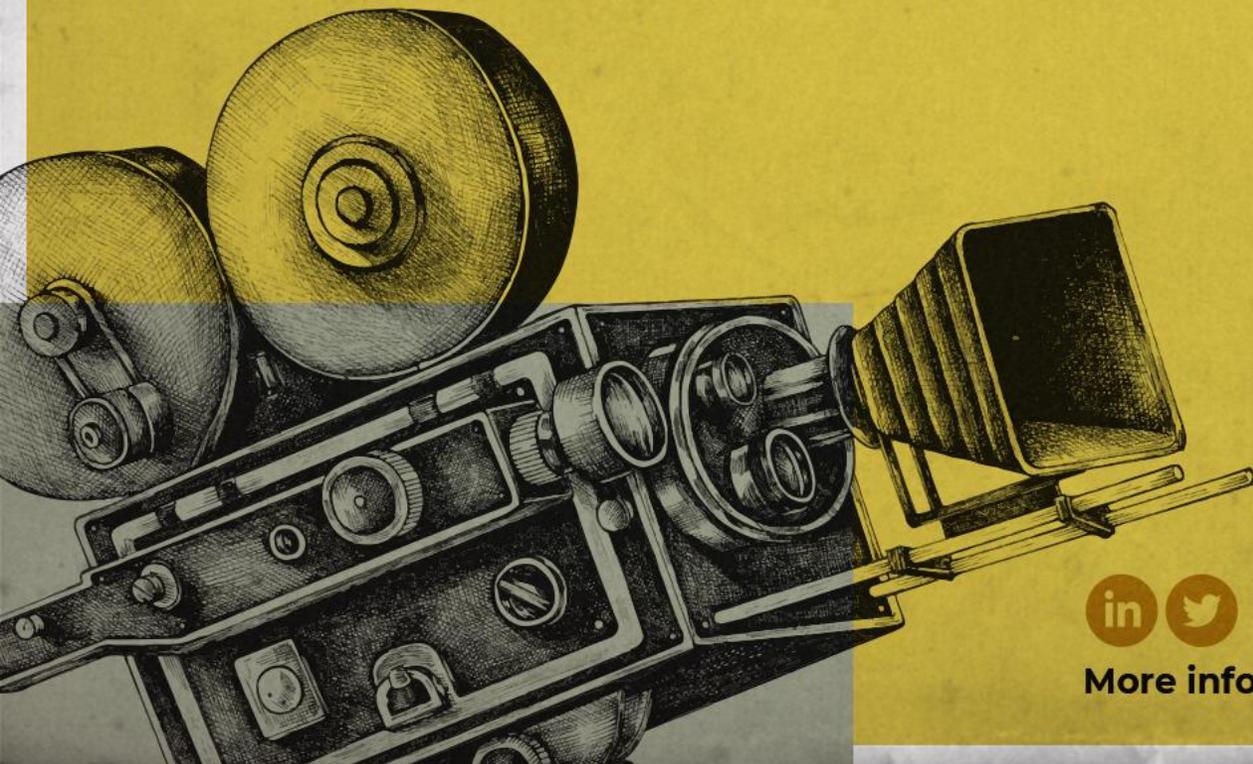


25TH MAY / 2022 ◊ VALENCIA, SPAIN

FINAL WORKSHOP

The NEMOSINE innovative package for cultural heritage preservation



More info at: nemosineproject.eu



NEMOSINE has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 760801.



FINAL WORKSHOP:

The NEMOSINE innovative package and solutions for 20th century cultural heritage preservation.



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Metal-Organic Frameworks as selective Acetic Acid Adsorbers

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INSTITUT
DES MATÉRIAUX
POREUX DE PARIS



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UNIVERSITÉ PARIS

Metal-Organic Frameworks (MOFs)



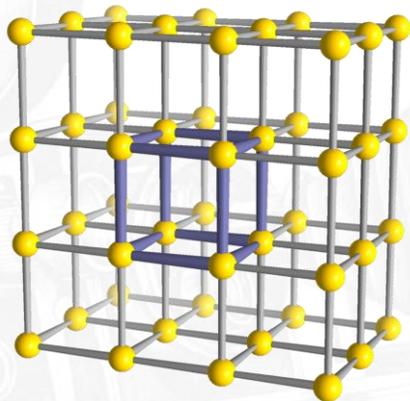
Inorganic Building units

≡ Single Metal ions, o-clusters, chains...



Organic Building units

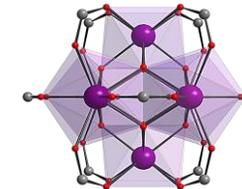
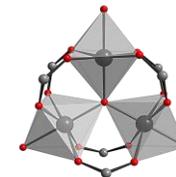
≡ spacers



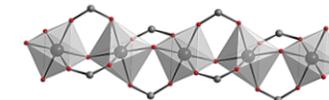
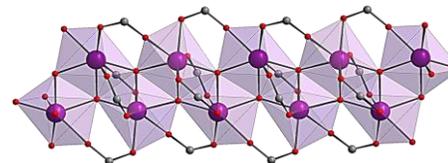
Crystalline 3D Structure



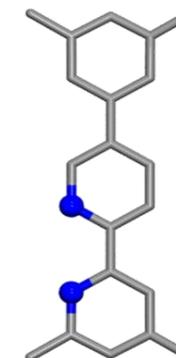
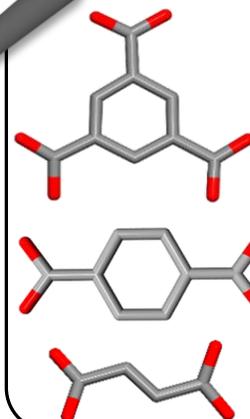
M^{n+}
(Al^{3+} ; Fe^{3+} ; Cr^{3+} , Zr^{4+} ...)



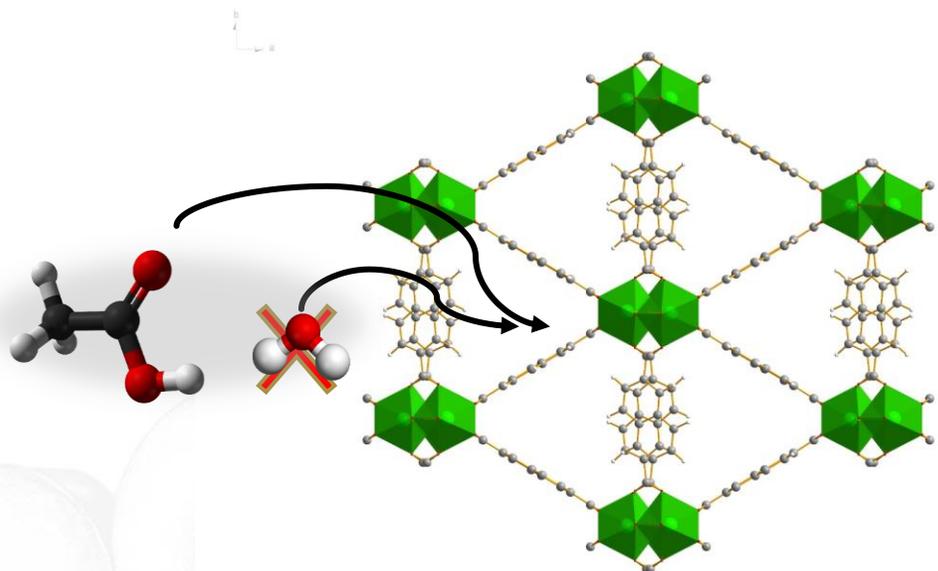
Oxo-clusters



1D chains

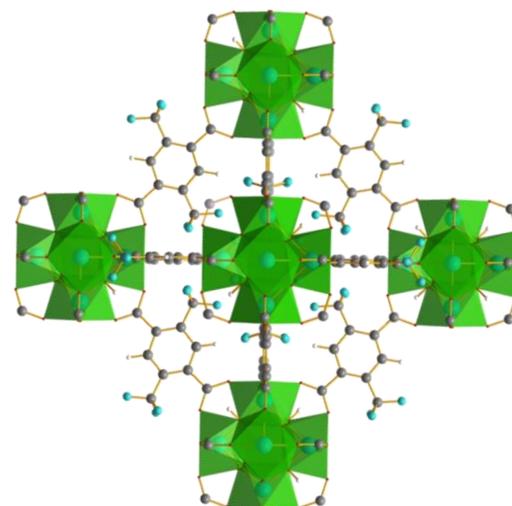


MOFs selection



MIL-140B

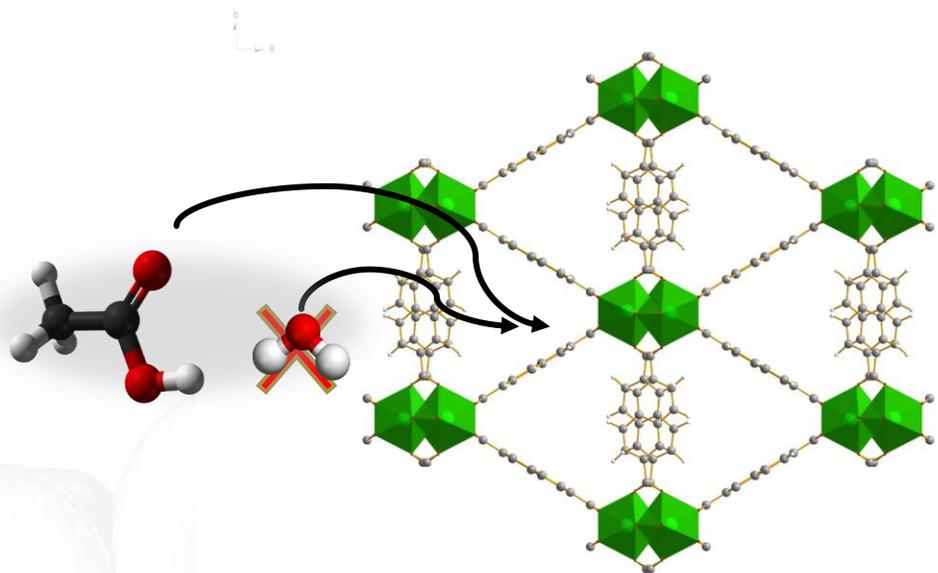
- Hydrophobic MOF
- Absence of polar groups in the inorganic nodes (e.g., -OH)



UiO-66-2CF₃

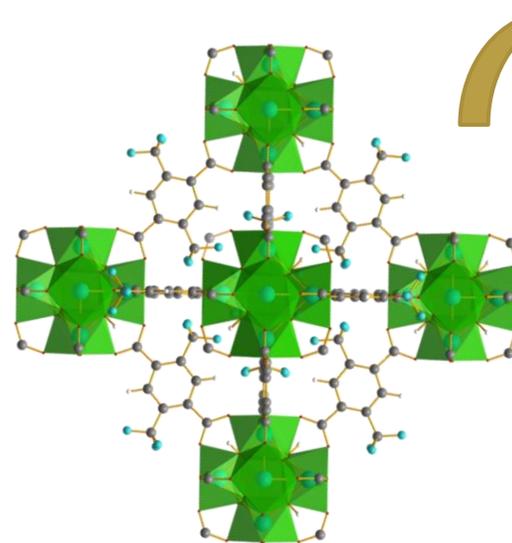
- Stable material
- Functionalized linker with hydrophobic groups (-CF₃)

MOFs selection



MIL-140B

- Hydrophobic MOF
- Absence of polar groups in the inorganic nodes (e.g., -OH)

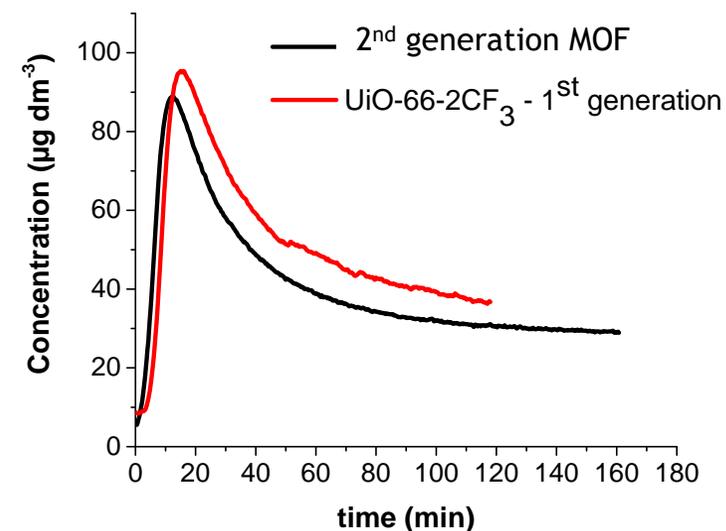


UiO-66-2CF₃

- Stable material
- Functionalized linker with hydrophobic groups (-CF₃)

2nd generation MOFs:

- Higher performance
- Synthesis in green conditions



Synthesis and scale-up of 2nd generation MOFs

MOFs development & Synthesis optimization



Green synthesis & Scale-up



Shaping

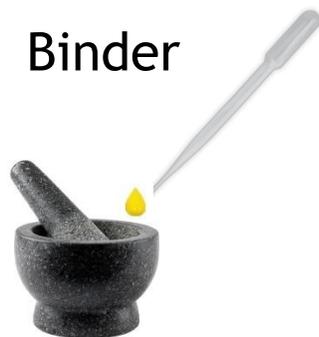


Scale-up and shaping of 2nd generation MOFs

MOF



Binder



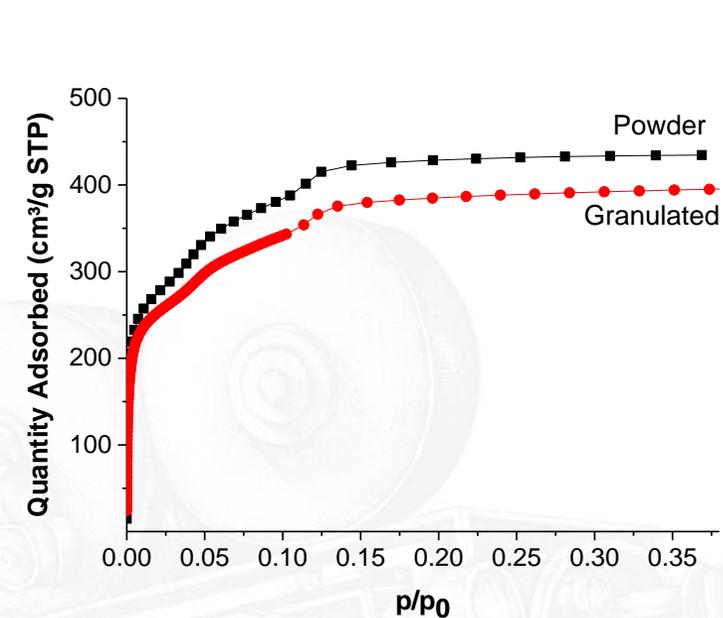
Granulation



200 g scale shaping

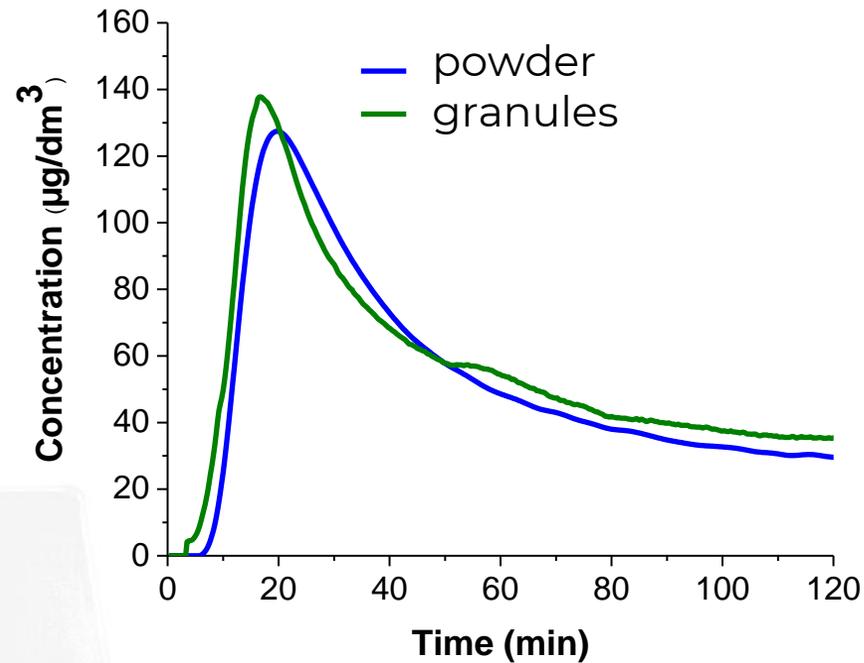
- Different formulations of binder/lubricant tested;
- Best mechanical stability/performance with 10% silica.

Shaping of 2nd generation MOFs



10 wt% Silica added

☑ 10 % loss in N₂ adsorption



Adsorption properties after
shaping maintained





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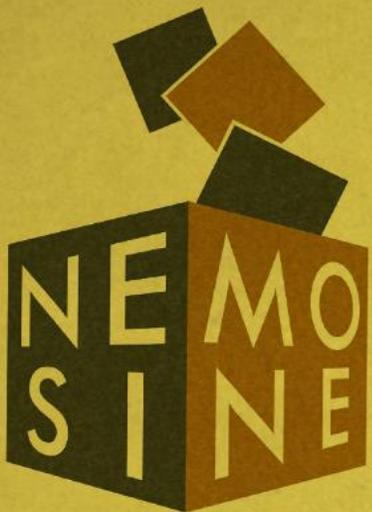
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- Catia Freitas



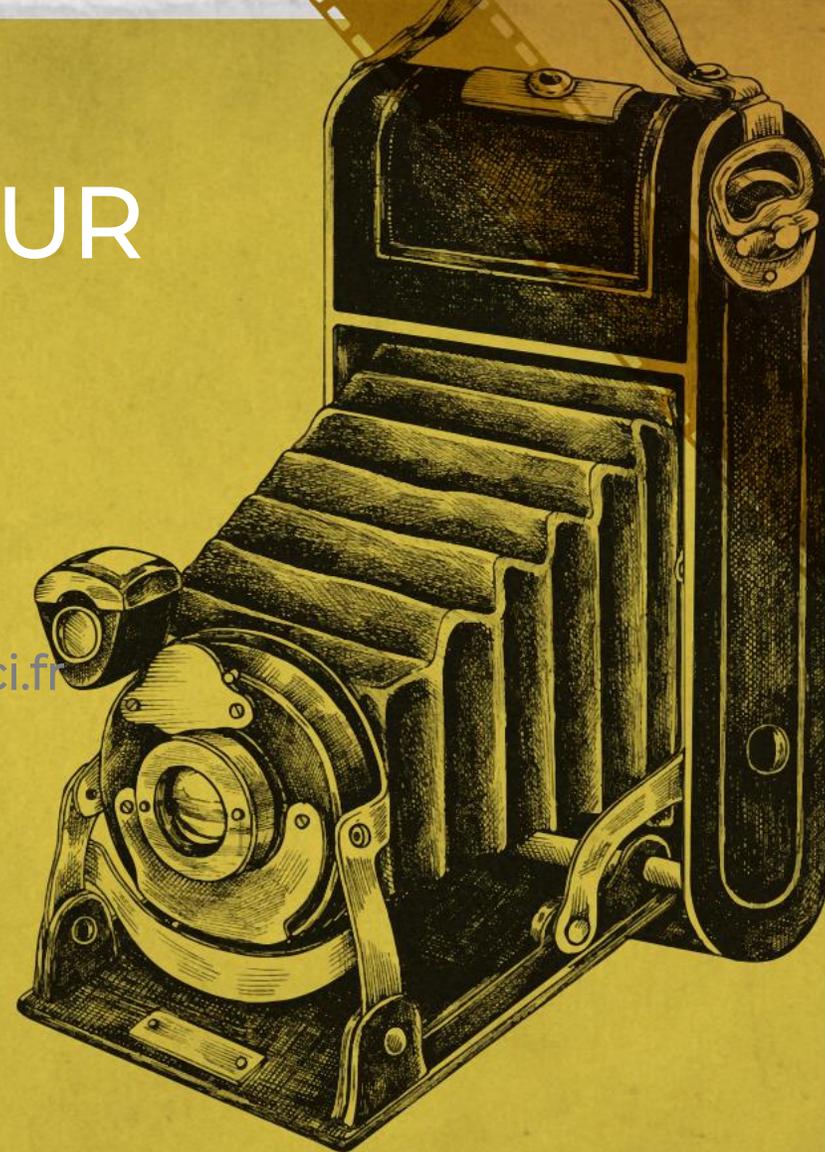
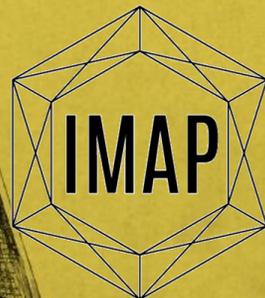


THANKS FOR YOUR ATTENTION

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