Sepiolite based catalyst supports produced by combined freeze-robocasting technique

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FUNDACIÓN AGENCIA ARAGONESA PARA LA INVESTIGACIÓN Y EL DESARROLLO

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01. Motivation…

02. Background work and why sepiolite ?

03. Next generation catalyst supports

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03. Next generation catalyst supports

Air Carbon Recycling for Aviation Fuel Technology

www.4aircraft-project.eu

4AirCRAFT

G.A. 101022633

- **Funding Programme:** H2020-EU.3.3.3. Alternative fuels and mobile energy sources Alternative fuels and mobile energy sources

Topic: LC-SC3-RES25-2020- International cooperation with Japan for Research and Innovation on advanced biofuels and alternative renewable fuels

Duration: May 2021 – April 2024

CONSORTIUM Air Carbon Recycling for Aviation Fuel Technology

GOAL Direct CO_2 conversion into C_8-C_{16} liquid fuels at mild conditions

The 4AirCRAFT technology uses an innovative catalytic reactor to conduct the conversion in:

Product.
Precise synthesis and high yield of jet fuel

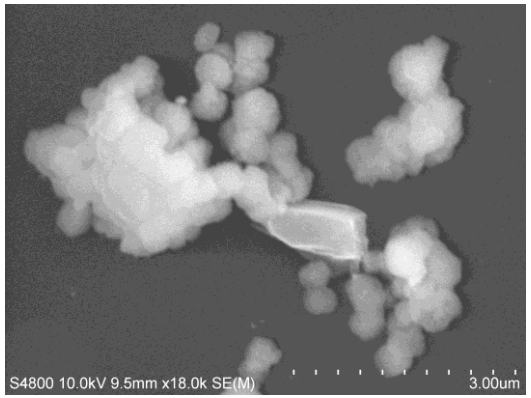
Integration.
Single cascade reactor

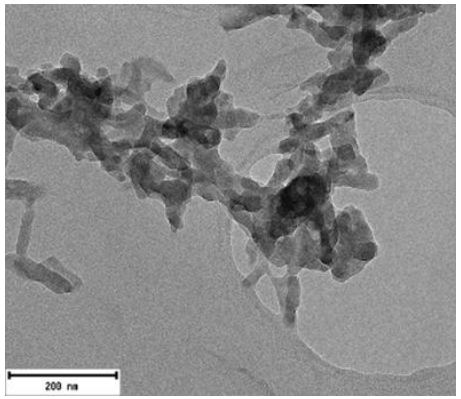
Mild conditions.
Unprecedented low temperature

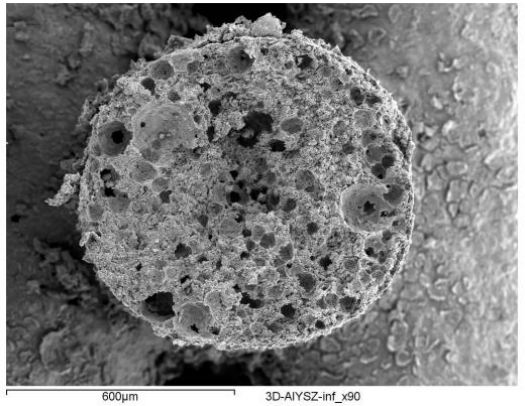
Rational design.
Hybrid catalyst integration & synergetic approach

Disruptive technology.
Validated at lab scale

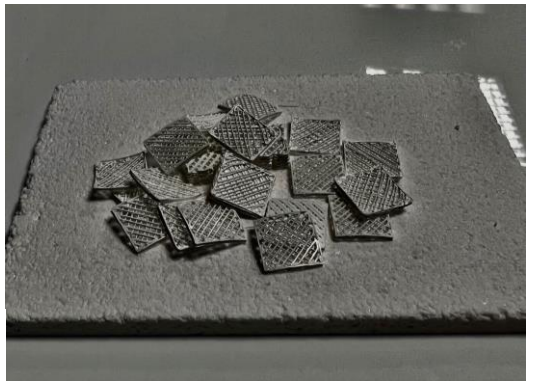
4AirCRAFT - Objectives

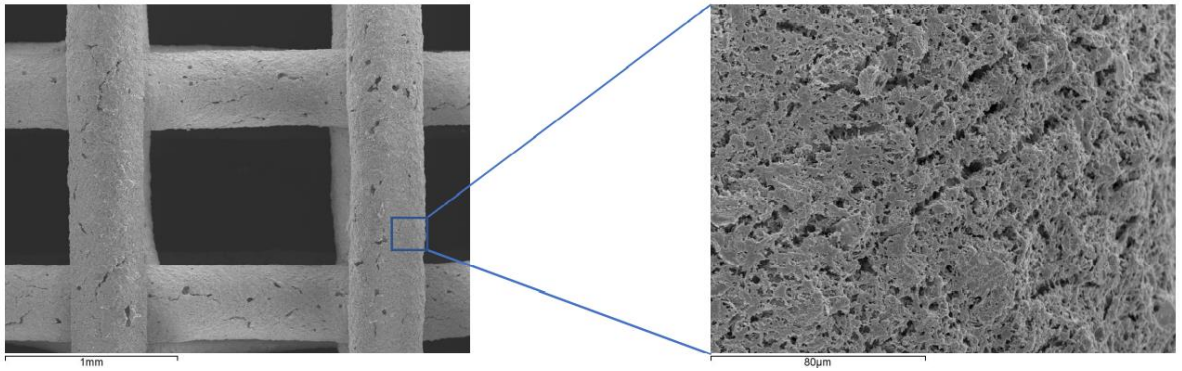




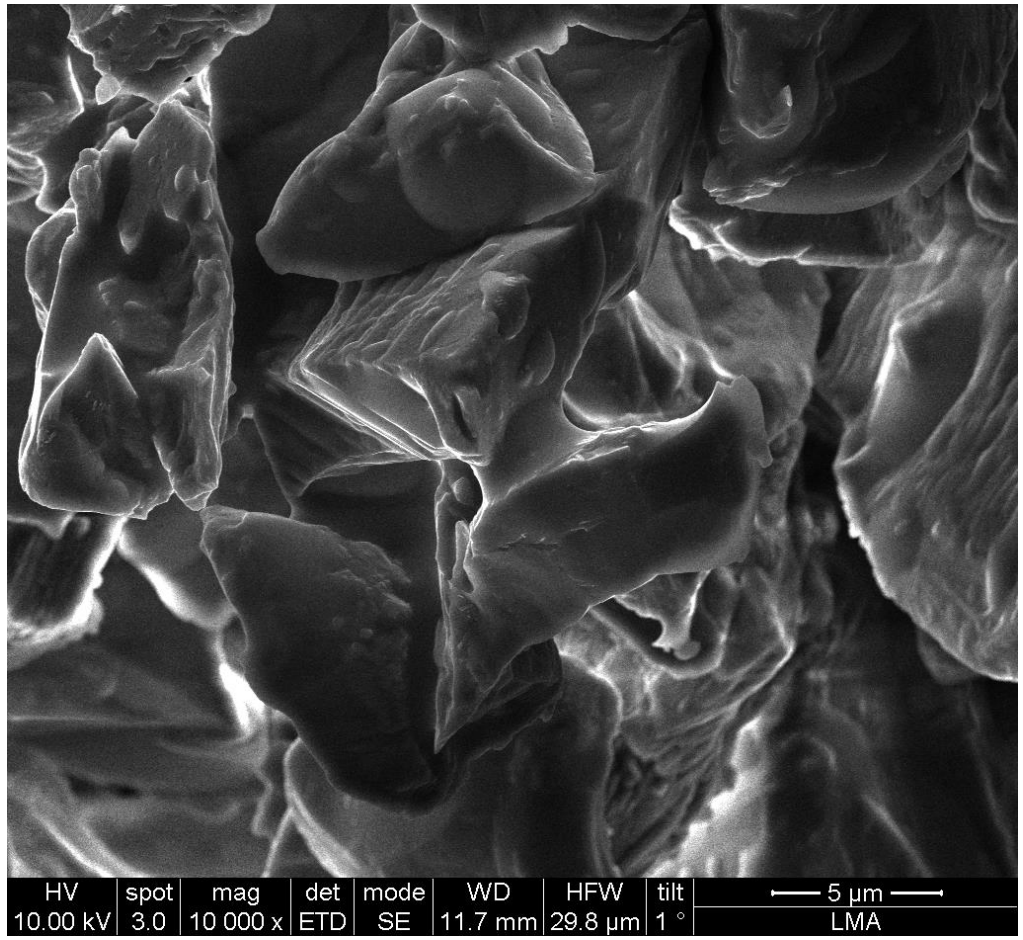


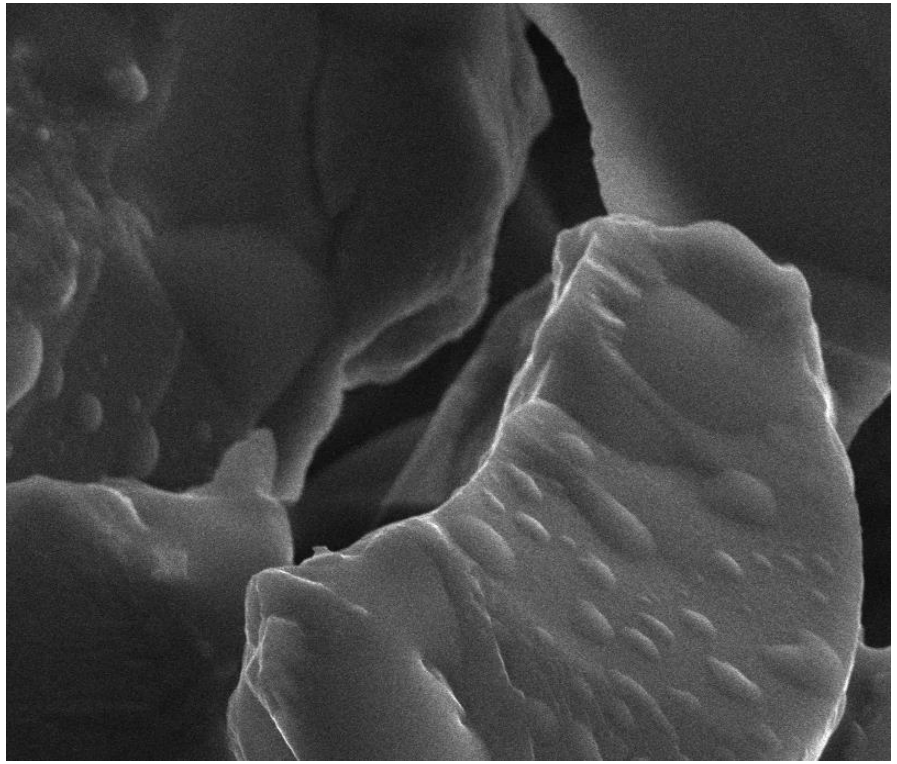
- Novel catalysts and Advanced Catalysts Carriers
- **Meso-macro-structured reactors**
- Structural and mechanistic investigations
- Proof of concept and Impact



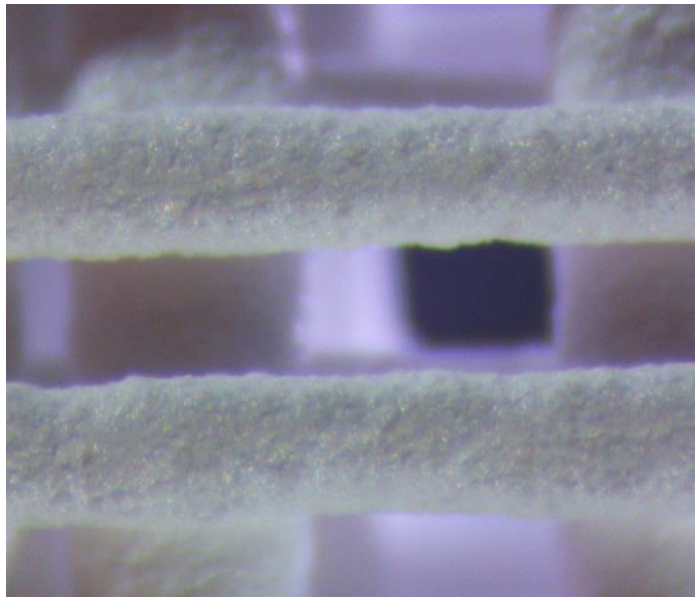


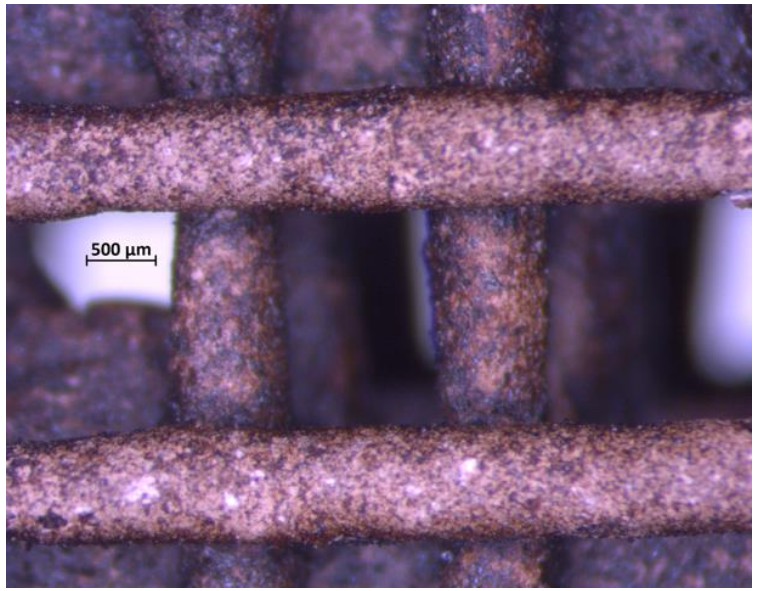
03. Next generation catalyst supports



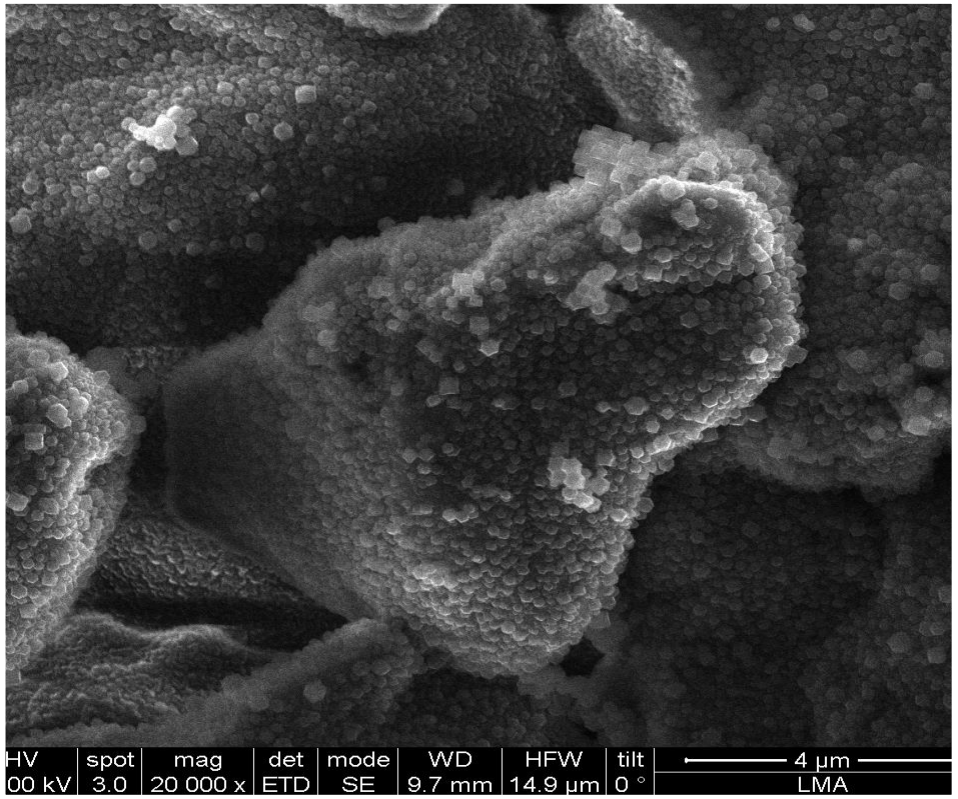


03. Next generation catalyst supports

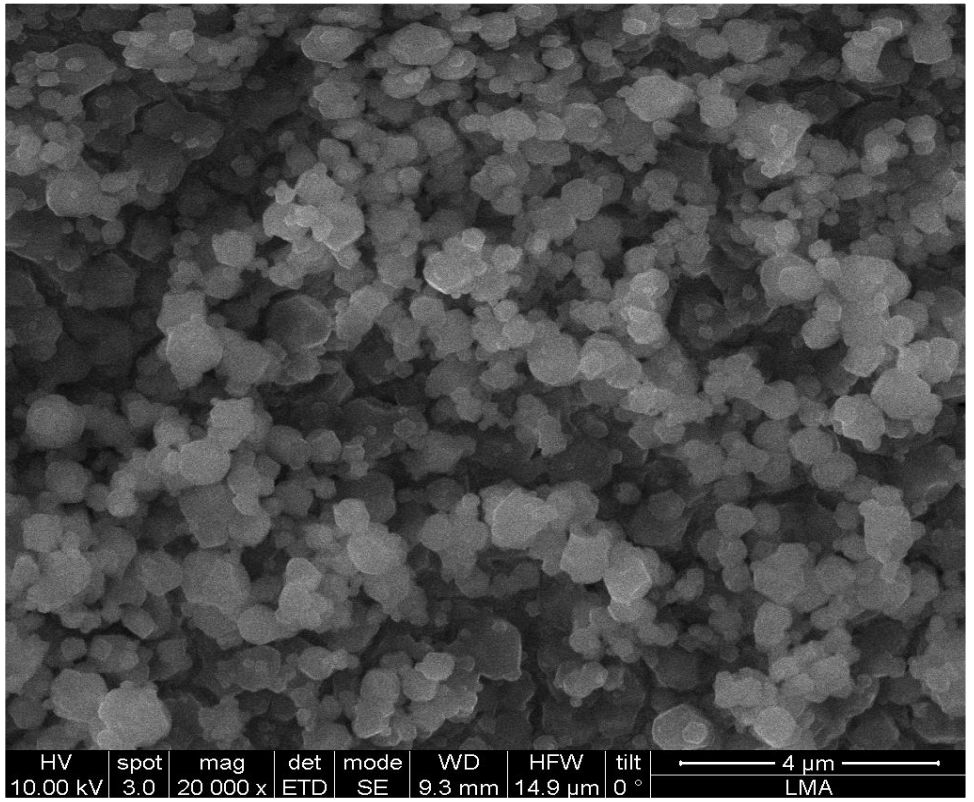




MOF: ZIF-8



MOF: UiO-66-COOH



Conclusions

Pros:

- High liberty regarding the composition of the printing material
- High ”purity” final materials (low ash/contaminant organic additives)
- No need for slow de-binding/sintering cycles to achieve final materials
- Relatively high liberty in print sizes
- Sepiolite can be deployed as rheology modifier and sintering aid

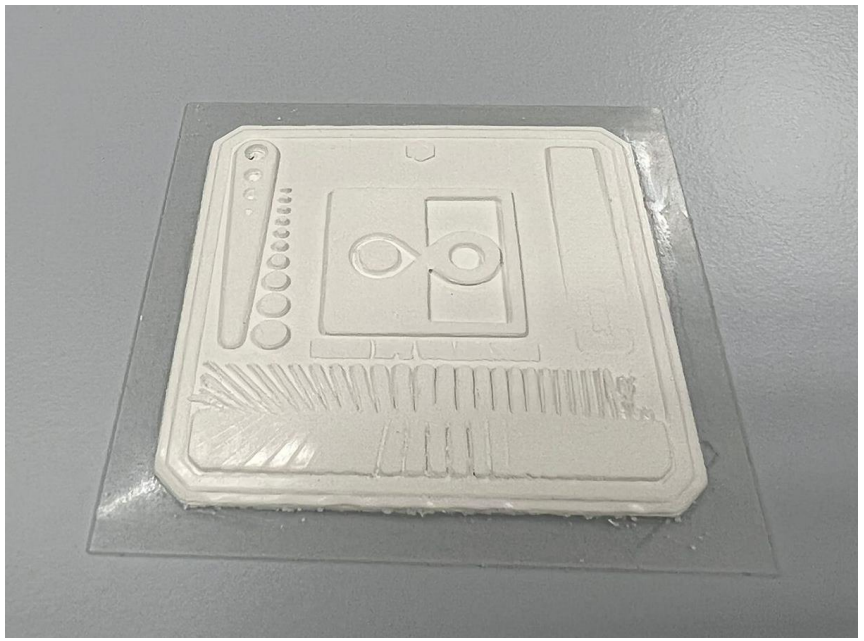
Cons:

- Resolution
- Difficulty printing complex geometries not based on struts

Conclusions

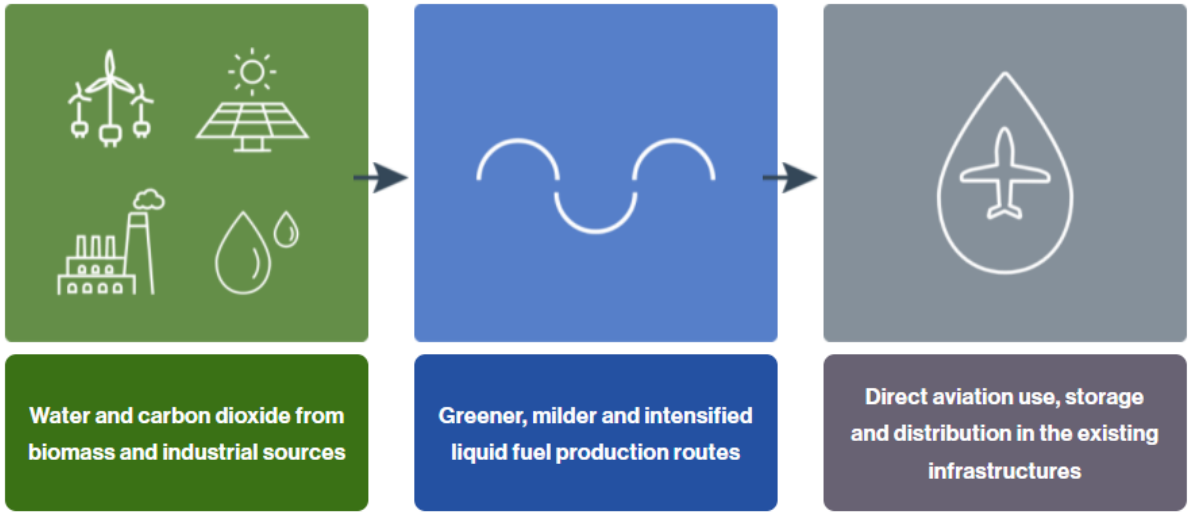
Higher resolution & complex geometries → DLP based 3D printing with water based resins

YSZ



Aknowledgements

Air Carbon Recycling for Aviation Fuel Technology - 4AirCRAFT



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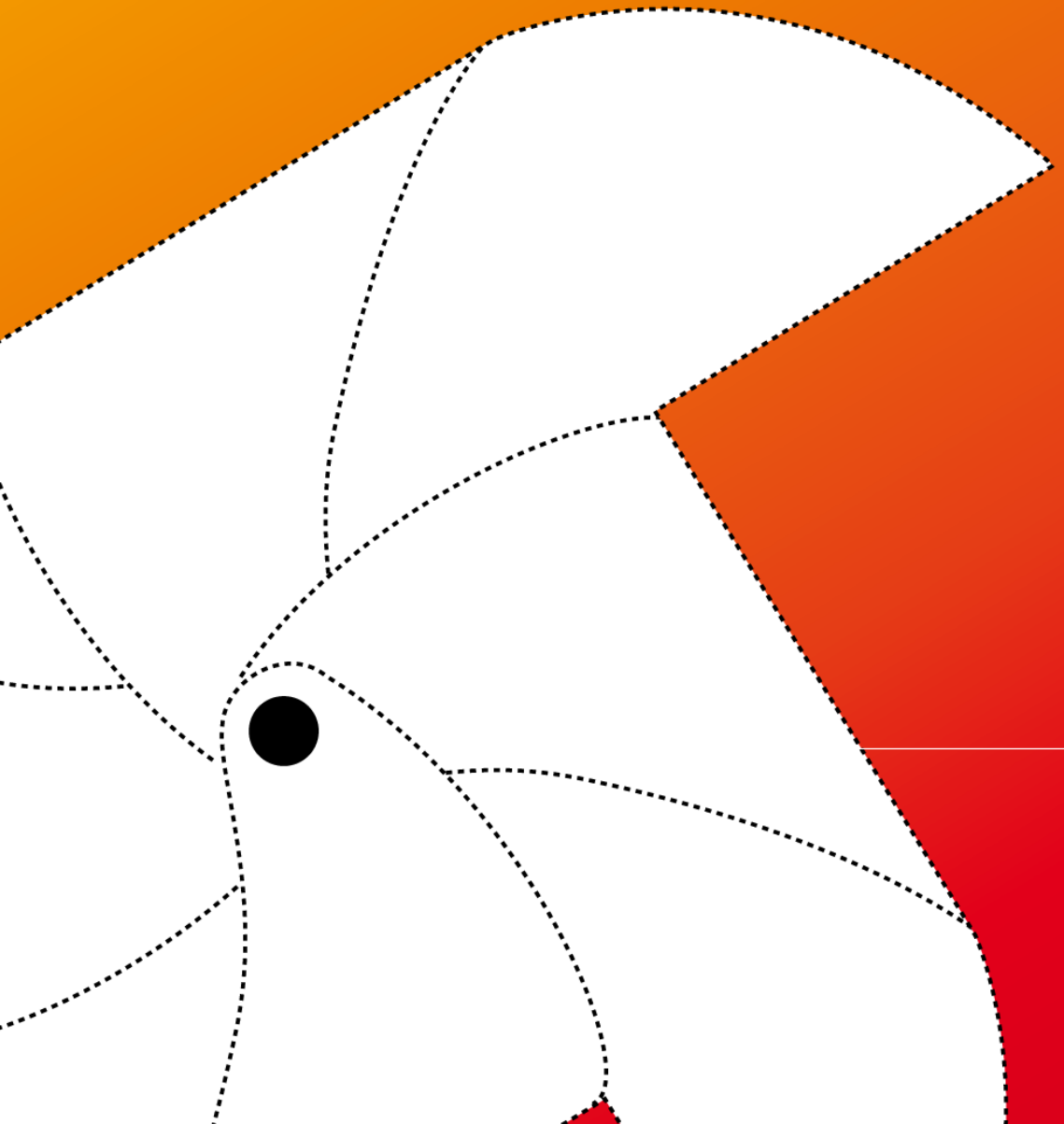

Thank you for your attention

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