

# Next generation of **bio-foams**



unlocking natural powers of cellulose fibers into  
**3D advanced fiber networks**

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Dec 2024



# The paradox of cellulose fibers and water

## Natural fibers love water

*we design product to resist it*

- paper cups with **plastic linings**
- cardboard **deteriorate** when wet
- paper products –  
**2D simple, limited functionality:**



water absorbtion



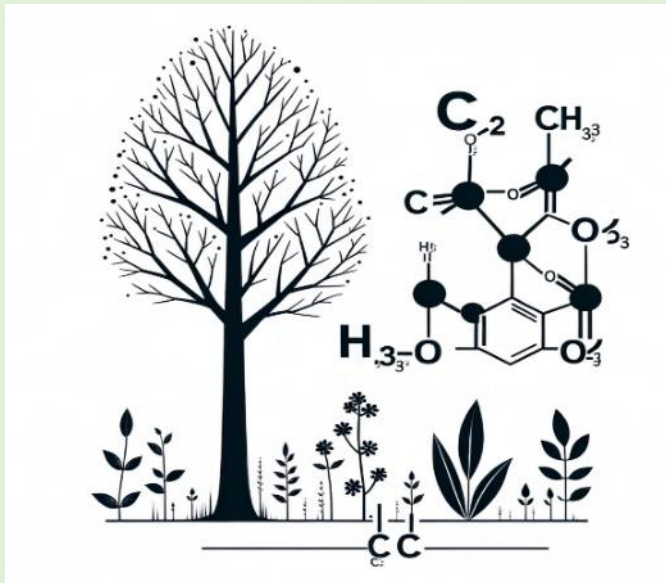


# Bio-materials challenge: adding 3rd dimension to fibrous networks

## cellulose fibers

**abundant** renewable resource

major over 70% of biomass



FibriTech

**pioneering advanced 3D biomaterials**

**bio** => cellulose fibers from any biomass



control of **color**



# Our disruptive process of fiber expanding and forming in 3D moulds

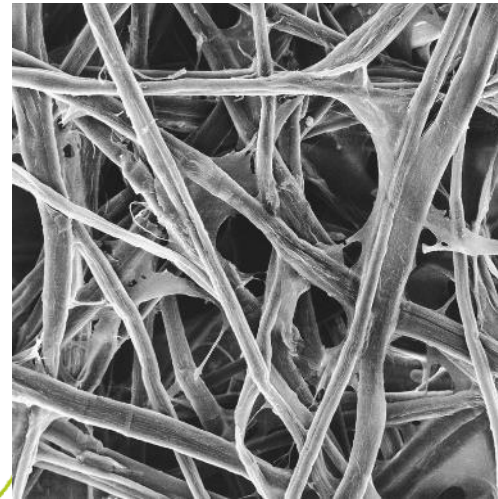


control of **thickness**



**scalable** dimensions

foamed **OH-bonded**  
cellulose fibers



**porous 3D**  
**biomaterial**



variety of **3D shapes**



control of **density**



# Platform technology with many applications on diverse markets

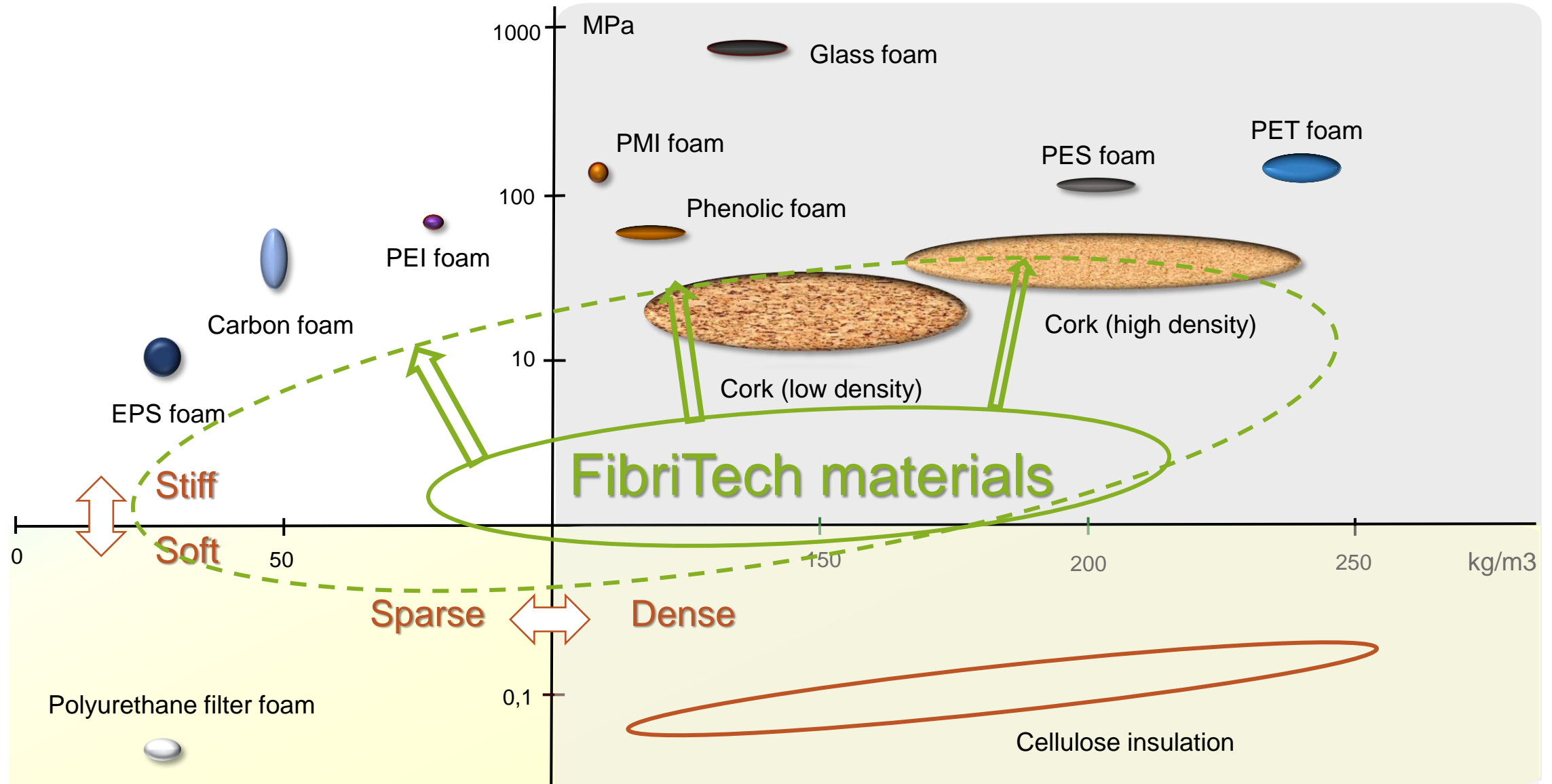
- **Oil absorbents & filters**
- **Soilless substrates**
- **Bio-composites**
- **Sandwich boards**
- **Construction panels**
- **Sports protectors** (helmets, ski boots)
- Thermal/sound insulation panels
- Packaging protections



& many more!



# Broad possibilities in mechanical parameters development





# FibriTech 3D material – strongly porous & hydrophilic\*

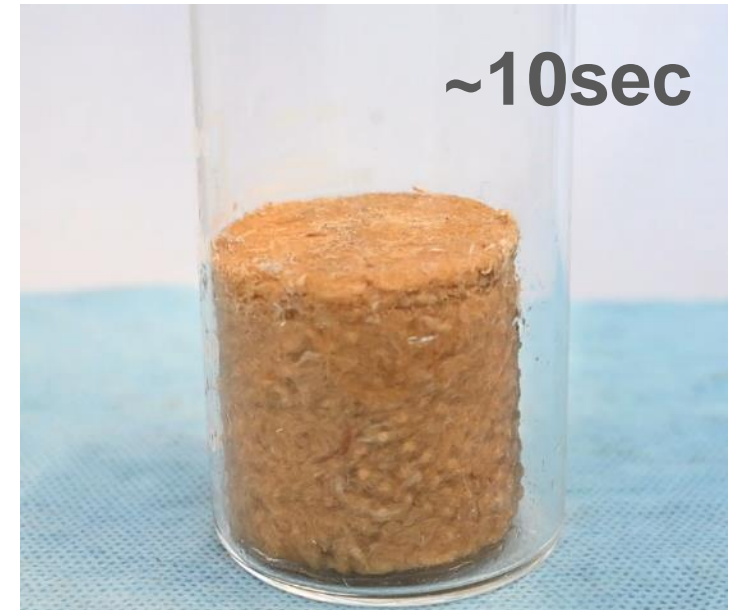
\*by nature of organic fibers



quick absorption



no change of volume



compact solid structure

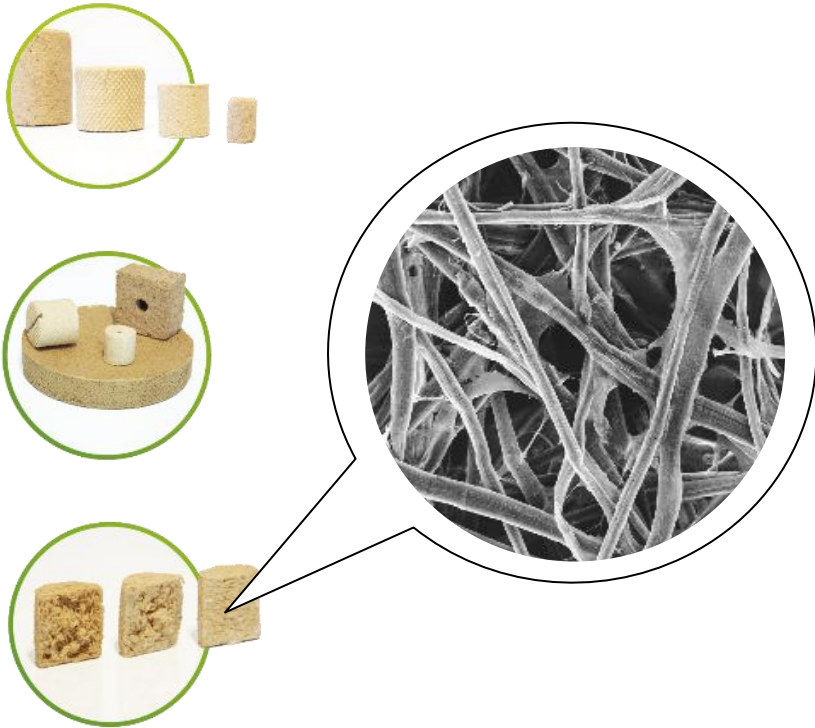




# Deep-tech engineering of cellulose fibers to advanced functions

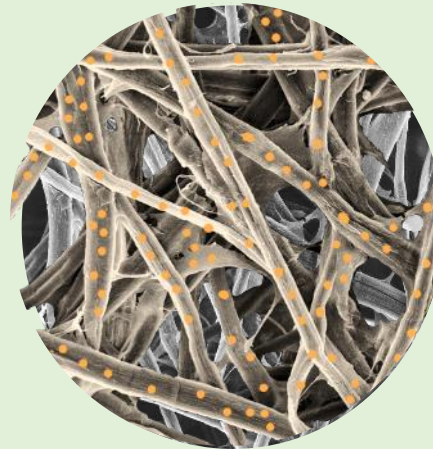
fabrication process

3D light & strong



**bio additives**

material category



**disruptive  
bio-mimicking**

functional

applications







# Hydrofobic & **oleophilic** – natural oil absorbers

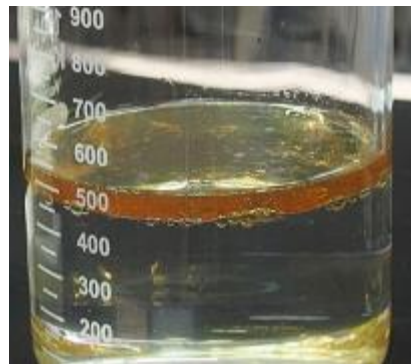
efficient



~1 sec

**x15**






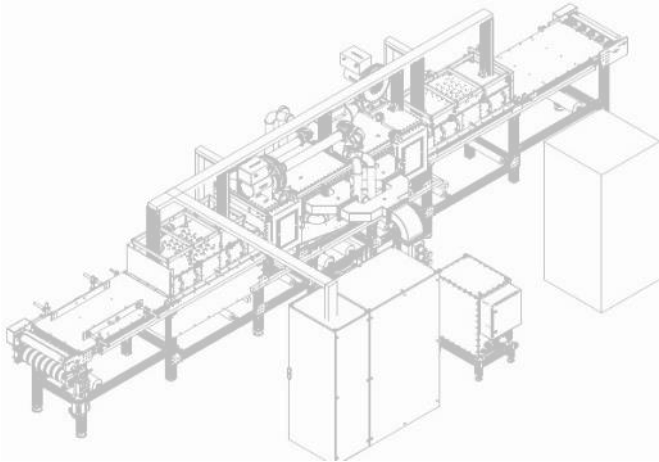







1g absorbs  
15g of oil



~120 sec



# Technology: scalable bio-industrial process – 3 patent families for **3D bio-mimicking**

fiber feedstock source agnostic	biomass new mix	3D moulding	3D forming	material properties	products
cellulose ligno-cellulose	recipes <i>fibers 90-100%</i>	3D printing mould design	fast drying EM machines	<b>functional bio-additives</b>	design & adaptations
<div>plants &amp; wood virgin recycled waste TMP, CTMP</div> <div></div> <div></div> <div></div>	<div>patent families: &amp; know-how</div> <div></div> <div></div>	<div><b>1: industrial 3D forming process</b></div> <div></div>		<div><b>2: platform material categories</b></div> <div></div> <div></div> <div></div> <div></div>	<div><b>3: applications product features</b></div> <div></div> <div></div> <div></div>

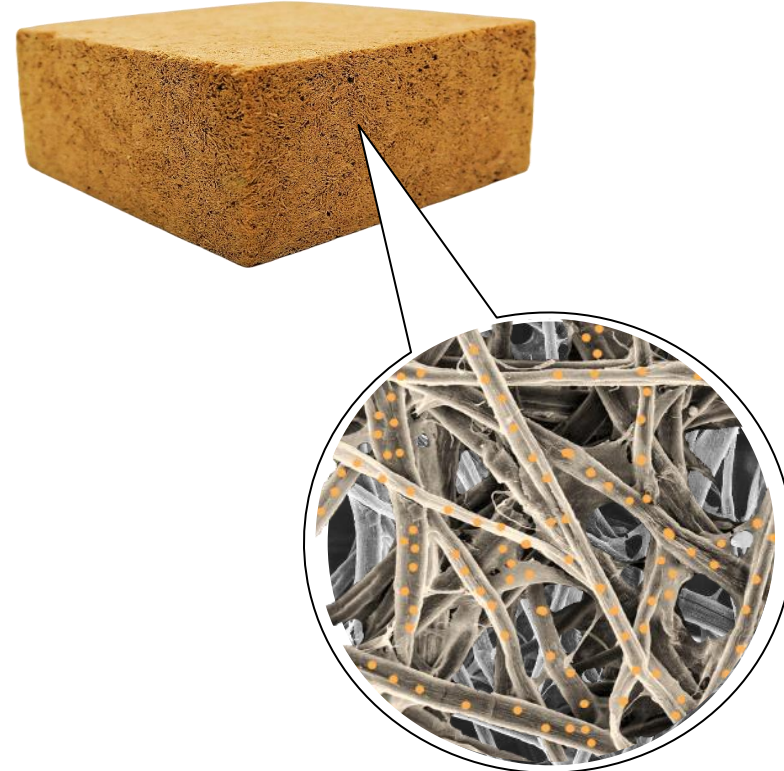


# Competitive edge – unique next generation industrial bio-tech

## First in the world advanced 3D biomaterials

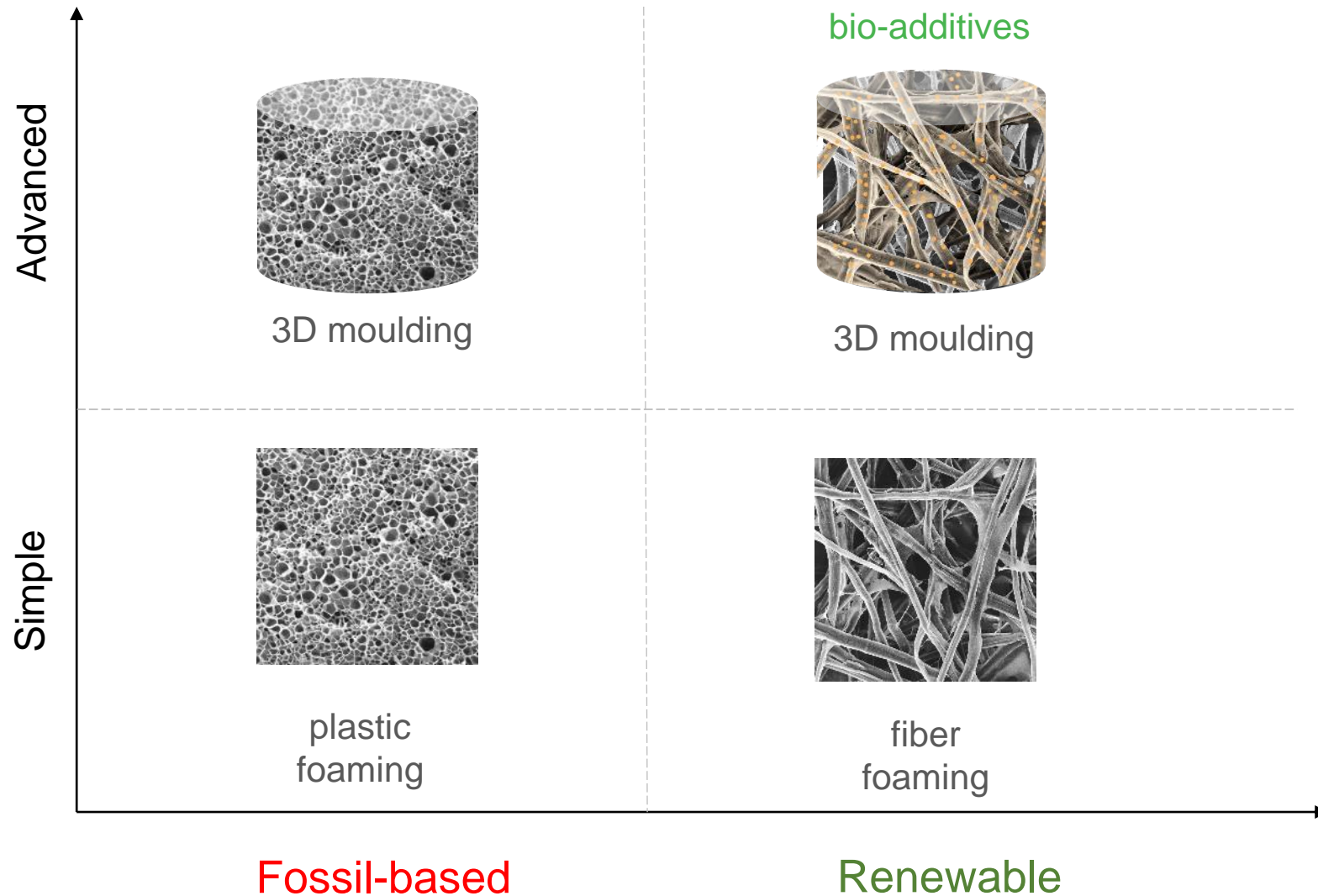
### Functional unique parameters:

- light: 50-200 kg/m<sup>3</sup>
- strong: 10-20 MPa
- soft or stiff, 3D mouldable
- porous: filtration, antibacterial
- wood compatible – gluable to wood
- thermal & sound insulation combo
- selective, absorbing water or not
- gradable flame retardancy
- impact energy dumping





# Comparison of fundamental technology platforms for foams





 Partner with us!



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**we make eco matter**





**3D biomaterial future**

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