



ALMA MATER STUDIORUM  
UNIVERSITÀ DI BOLOGNA

in cooperation with



Fraunhofer Innovation Platform for  
Waste Valorisation and Future Energy Supply

**FIP-WE@UNIBO**



## SECOND GENERATION CARBONS FOR GREEN INDUSTRIAL APPLICATIONS

FIP-WE@UNIBO  
Via Ciro Menotti 48  
48122 Marina di Ravenna

Contact Person  
Dr. Diego Marazza  
Responsible for R&I  
Phone +39 0544 937334  
diego.marazza@unibo.it

Co-Director UNIBO  
Prof. Andrea Contin  
Phone +39 0544 937333  
andrea.contin@unibo.it

Co-Director Fraunhofer  
Dipl.-Wi.-Ing Fabian Stenzel  
Phone +49 9661 8155-432  
fabian.stenzel@umsicht.fraunhofer.de

Second Generation Carbons refer to carbon-rich nano-structures such as biochar, carbon nanotubes, graphene, graphene oxide (GO), fullerene, carbon-nano-fibers (CNF).

We develop functional and low cost carbon-based materials from biogenic residues, waste and recycled fossil material for industrial scale applications.

### Keywords

- Recycling technologies
- Phosphorus recovery
- Industrial waste
- Sewage sludge

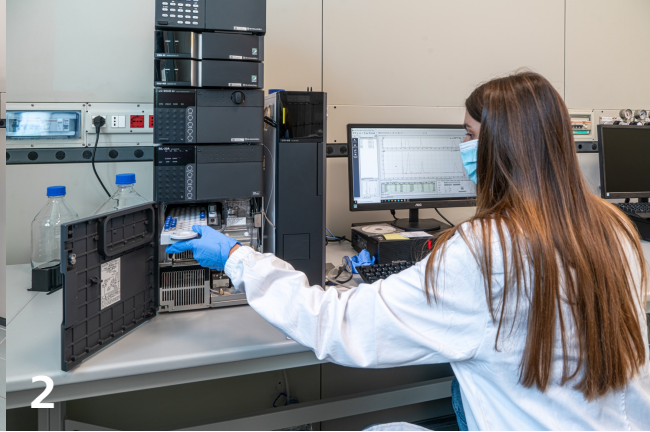
### Target groups

- Municipalities
- Plant operators
- Plant manufacturers
- Sewage management
- Waste management



1

1. Pilot plant unit to test adsorption and pollutants removal



2

2. High Performance Liquid Chromatography

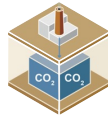
## Applications



adsorbent materials



slow functional chemical release materials



carbon sequestration



soil improvers and agriculture



municipal and industrial effluent treatments



soil and water (bio)remediation

## Technical equipment

- Muffle up to 1200°C in controlled atmosphere
- GC-MS Agilent
- ICP-OES Agilent
- CHNS/O Elementar
- HPLC / Ionic Chromatography
- Porosimeter Tristar
- PID VOC analyser

## Our services

- Developing recovery, recycling and reutilisation pathways from biogenic residues, waste and recycled fossil material up to carbon-based materials regeneration
- Designing newly functional and composite materials to recover nutrients and to remove pollutants; chemical and microbial functionalisation
- Production and test of biogenic carbon-based materials at TRL >5
- Soil improvers from compost and carbon-based materials co-maturation
- Bio-engineering of carbon-based materials
- Predicting long term effects and carbon sequestration potential

## Your benefit

- Reduced costs through substitution of costly activated carbons
- Recycling of carbon-rich materials
- Optimized selection and development of materials depending on application