# Carbon Fibres & Advanced High Performance Composites Cluster (CFPC)

## ADVANCED MATERIALS AND NANOTECHNOLOGIES IN MOTION

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Website: http://www.technologycluster.eu/

# CFPC Description

- ✓ The **Carbon Fibres and Advanced High Performance Composites Cluster (CFPC)** is a European initiative set up at the beginning of 2015.

- ✓ Five projects, which initially formed this council, relate to the sustainable production and recycling of carbon fibres (CF) and carbon fibre composites.

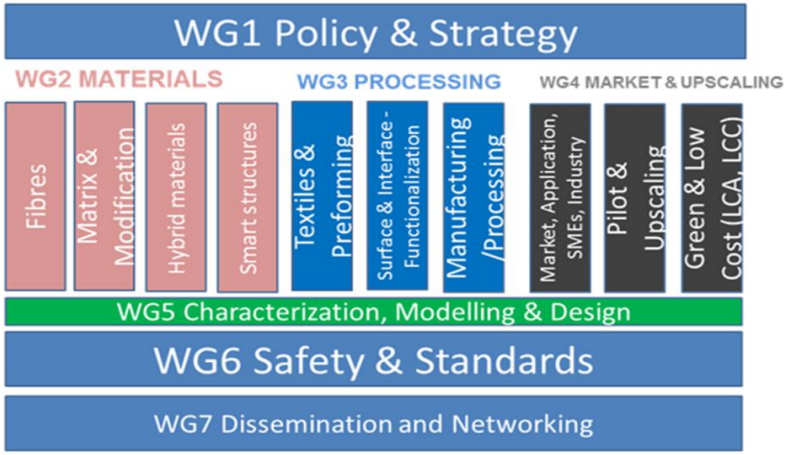
  - ✓ **CARBOPREC**
  - ✓ **FIBRALSPEC**
  - ✓ **NEWSPEC**
  - ✓ **EUCARBON**
  - ✓ **REFORM**

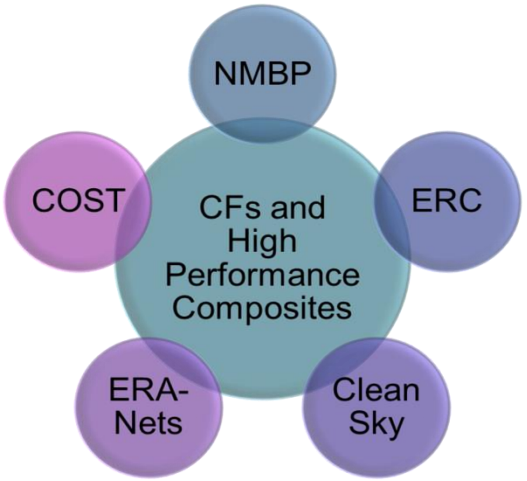
- ✓ The Cluster activity aims to bring together EC funded projects to enable the sharing of ideas, results and concepts, contributing to the EU Strategic Research Roadmaps and to use the synergistic effect to improve the dissemination and exploitation of the project results and enhance their impact.

# CFPC Objectives

- **Alternative precursors** for high-performance fibres.
- **Pilot/industrial facilities** for high-performance composite products.
- **Life Cycle Assessment and Life Cycle Cost** studies.
- **Modelling and simulation** tools towards optimisation of fibre reinforced composite products and manufacturing processes.
- **Fibre reinforced polymer composites** (FRPC) and products
- European **research and industrial network** for advanced high-performance composite products

# CFPC Structure



# Sharing of ideas:

- **Increased awareness and uptake** by industry
- **Effective access** to specialized techniques and advanced equipment.
- **Reduction of costs for product design and time-to-market**
- **Recycling of composite materials**
- **Best practices and creation of standardised protocols**
- **Standard operation protocols** for industrial end-users
- **Effective communication** of emerging developments and innovations in composites manufacturing
- **Roadmapping** for the development of advanced materials manufacturing
- **Digitalization of data. Reliability of data**

# Results & Concepts:

## Roadmap

**Materials**

- Micro and meso architectures for composites
- REACH compliant matrices for composites
- Alternative precursors
- Semi-product development and supply chain
- Bio-based CFRP

**Processing**

- Nano-modificationfor multifunctionalities
- Carbon Fibre Conversion Technologies
- Recyclability of Carbon Fibre Reinforced Polymer Composites
- Cost-effective composite manufacturing technologies
- Multifunctional and smart composites

**Market/Upscaling**

- High volume applications
- European composites manufacturing platform
- Composites coordination and strategic roadmapping actions

**Safety/Standards**

- Structural materials driven by enhanced energy management

Life Cycle Assessment of Carbon Fibre Composite products

Occupational Health and Safety practices

**Modelling / Characterisation**

High performance computational tools for advanced composites

Advanced characterization techniques

Standardization and data sharing

Component Monitoring Defect Detection

New concepts in design optimization

Automation, Industry 4.0

# Role of Testing & Characterisation:

- ✓ Characterization tools → **end products** from **high performance composites** in EU
- ✓ Identifying the needs of the community → experimental **characterisation and modelling**
- ✓ **Peculiarities** of carbon fibres and advanced composites.
- ✓ Identification, classification of material properties → determine the **range of application**
- ✓ Characterization tools for validation/corroboration → feed **models at different scales**
- ✓ Provide **validated and calibrated data**

**Collaboration with the European Materials Characterisation Council**

**(EMCC, http://www.characterisation.eu/)**

# Open Innovation / Innovation Test Beds

- ✓ Access to **global value chains** and long-term cooperation with strategic partners.
- ✓ **Global competitiveness** and **independence** for the EU.
- ✓ Production and **commercialization** of composite products.
- ✓ **Linkage between infrastructure.**
- ✓ **Common industrial value chains/supply**.
- ✓ **Single-entry-point online platform**.
- ✓ **Global network** of manufacturing institutes.
- ✓ Development of **new skills.**
- ✓ **Continuous dialogue** with existing clusters.
- ✓ Generate a **knowledgebase**
- ✓ Support **digitalization**

# Synergistic effects to enhance the impact of the cluster interest in strong EU governance

- ✓ European Technology Platform for Advanced Engineering Materials and Technologies **(EuMaT)**
- ✓ European Materials Modelling Council **(EMMC)**
- ✓ European Materials Characterisation Council **(EMCC)**
- ✓ European Pilot Production Network **(EPPN)**
- ✓ Nanosafety Cluster **(NSC)**
- ✓ Research Data Alliance **(RDA)**
- ✓ **Nanofutures** initiative
- ✓ Alliance for Materials **(A4M)C**
- ✓ European Materials Societies **(EMRS, ESCM, EUCIA)**
- ✓ **ECP4**- European Composites, Plastics and Polymer Processing Platform
- ✓ Research Center Carbon Fibers Saxony **(RCCF)**
- ✓ Global Scientific Association on Advanced Carbon Fibers **(GSAC, 3 May 2018, Dresden)**


**Contribution with know-how and experience to the research and development on advanced carbon fibers**

# Future Challenges:

DRESDEN concept

1. **Material systems** for future oriented multi-material-design
2. **Material understanding** for the development of lightweight structures, systems, and processes
3. **Design and calculation methods** for system lightweight engineering in multi-material-design
4. **Virtual development** of lightweight materials, structures, and systems as well as accompanying processes along the complete value chain
5. Material comprehensive methods and technologies for closed **recycling loops**
6. **Function integrative lightweight structures** with sensor und actor properties
7. Destructive and non-destructive **material, part, and system characterization** for the experimental monitoring of future material development
8. Resource efficient, self adapting **production processes**
9. **National and international cooperation** with leading institutes as well as close cooperation with complementary scientific disciplines
10. **Interdisciplinary education** with communication of broad basic knowledge and deeped special knowledge with high praxis orientation
11. Synergetic, result oriented **Knowledge and technology transfer** with close connection of research, industry, and education as well as a living alumni-network

# -Thank you –

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