

PARTNERS



BREMBO

Brembo is the world leader and acknowledged innovator of disc brake technology for automotive vehicles. Brembo supplies high performance brake systems for the most important manufacturers of cars, commercial vehicles and motorbikes worldwide, as well as clutches, seats, seat belts and other components for racing. Brembo is also a leader in the racing sector and has won more than 200 championships.



WARRANT GROUP

WG is a privately held consultancy SME company that provides full-spectrum consulting in business finance. WG has been active since 1995, growing over the years to become a leader in this sector. WG European Funding Division is specialized on European Funding consultancy, particularly in the project management, dissemination and exploitation of projects. WG EFD performs preparation and negotiation of projects as well as technical and financial reporting including auditing.



LAMBORGHINI

Automobili Lamborghini S.p.A. is more than just a manufacturer of incomparable super sports cars; it is a legend in the world of luxury brands in its own right. The company is now working hard to expand its leading position worldwide. At the new Advanced Composite Research Center at company headquarters in Sant'Agata, engineers and technicians are working on innovative design and production methods for carbon fibre applications in automotive engineering.



PETROCERAMICS

Petroceramics is an Italian SME built up on the cooperation of University of Milano and several industrial companies. Profiting of academic facilities and know-how, as well as of industrial constraints and feedback, this team acquired a key position on the field of research and development of new ceramic materials, trying to reconcile the rigorous and systematic approach of basic science to pragmatic solutions of engineering problems.



DITF

The German Institutes for Textile and Fibre Research Denkendorf (DITF), with an area covering 25,000 square meters and a research staff of over 300 employees, conducts interdisciplinary R&D projects involving chemistry, material sciences, process technology, material technology, mechanical engineering and plant design and management.



FORTH

The Institute of Chemical Engineering Sciences (ICE-HT) of Patras is a centre of excellence in the chemical engineering sciences both nationally and in EU. Its current research activities are focused on Nanotechnology/ New Materials, Energy/ Environment and Biosciences/ Biotechnology.



UNIVERSITY OF EXETER

The University of Exeter, part of the UK Russell Group of leading research-intensive universities, combines world class research with excellent student satisfaction. It was voted Sunday Times University of the Year 2012/13, is one of the UK's top 10 universities and is amongst the world's top 200.



VITO

VITO is a multidisciplinary public research centre which implements client-driven research projects and develops innovative products and processes. A staff of 650 highly qualified people makes this organization a crossroads of technology, where state-of-the-art know-how is successfully blended into practical applications. VITO's three main fields of activity are related to energy technology, quality of the environment and industrial innovation.



DIENES

DIENES offers pilot and laboratory equipment for the production and treatment of filaments, fibres and yarns. Furthermore mechanical and electrical components for textile machinery with special emphasis on induction heated godets and control systems for synthetic fibre lines.



INASCO

INASCO Hellas Co ("INASCO") is a high technology industrial SME founded in 1989. INASCO's core competences are in: Composite and Metallic Aerostructures Prototyping, Composites Materials Processing, Engine Noise Reduction Technologies and Space Avionics.



TECNARO

Founded in 1998, TECNARO GmbH develops, produces and markets bio-based and biodegradable materials. The business is focused on three different material families: Liquid Wood ARBOFORM®, Natural Fibre Reinforced Plastic Composites ARBOFILL® and Biopolymer Compound ARBOBLEND®.



VALEOL

VALOREM S.A.S is a green energy producer with headquarters in Bègles (Gironde) since 1994 and with 5 local agencies, 140 employees. Independent and pioneer in the development of wind power and photovoltaic in France, VALOREM is a responsible operator on and beyond its projects of EnR. The VALOREM group controls the entire chain of value of the development of production units in green energy, from potential evaluation, impact studies, BOP design, construction and worksite supervision.



YUZHNOYE

Yuzhnoye State Design Office named after M.K.Yangel was founded in 1954. Nowadays, Yuzhnoye SDO is one of the world leading companies in designing and development launch-vehicles, spacecraft, satellites, propulsion systems and rocket engines.



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Project Coordinator

Roberto Vavassori

rv.newssec@brembo.it

Project Scientific Coordinator

Matteo Falasconi

matteo.falasconi@warrantgroup.it

Project Manager

Isella Vicini

isella.vicini@warrantgroup.it

Web site

www.newssec.eu

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New cost-effective
and sustainable polyethylene
based carbon fibres for
volume market applications



The main objective of NEWSPEC is the development of CFs through promising low-cost polymers, such as polyethylene (PE).

PE presents interesting technical features like high carbon yield (around 70%), high processability and flexibility (many potential polymer modifications to examine) and very competitive cost (~2 euro/kg) with respect to PAN precursor which may result to precursor cost savings of up to 70%.

Final PE-CF production cost equals to 10 euro/kg compared to about 15 euro/kg of PAN fibres, thus reaching 30% cost saving on similar production scales.

Available PE precursor raw sources

- i) synthetic oil-based polymer
- ii) bio-polymer from dehydration of bioethanol
- iii) recycled from PE plastics waste

Target goal

Processing of continuous PE-CFs at HPFC (High Performance Fibre Centre) pilot plant facility based in Denkendorf (Baden-Württemberg/Germany).

Target properties of the PE-CFs will be: tensile modulus 200-250 GPa, tensile strength 2 GPa, elongation →1%, fibre diameter ←10 microns, optimal resin wetting and adhesion, tailored conductivity.

1. Propose a novel non-wet stabilization method that introduces heteroatoms at the precursor stage in combination with Electron Beam Curing (EBC) which makes the process very innovative, flexible, less time consuming and thus more economically viable.
2. Exploit the potential of nanomaterials - carbon nanotubes (CNT) and cellulose nano whiskers (CNW) - as nucleation agents to further reduce the requested stabilization time and the graphitisation temperature. Lowering the graphitization temperature from 1500° to 1200°C can contribute to cost reduction of about 15-20% with respect to typical PAN process. This will also contribute to overall cost saving.
3. Innovative functionalization routes for the surface treatment of PE-based CF will be explored: (a) atmospheric plasma technology for controlled oxidation and grafting of other selected functional groups to the surface; (b) new methods of rapid room-temperature grafting on graphitic surfaces using specific surface-attacking chemicals.
4. Set-up of a transportable confocal micro Raman system which will be used on the processing line for monitoring the various steps of CF synthesis.
5. Fundamental investigation and understanding of PE-CF/matrix interaction. Parameters such as Interfacial Shear Strength and the characteristic length scale (beta parameter) will be determined for various matrices and CF treatment and sizing.

END APPLICATIONS



Aerospace

Low loaded, secondary aircraft structures



Automotive

Structure, body and interiors



Automotive

Brake rotors and pads



Wind

Turbine blades → 50 m long & retrofit of medium turbines ←35 m long



Oil and Gas

Pipelines, pressure vessels for oil/gas components for harsh environments