SUBSTITUTION
SUSTAINABLE MATERIALS FOR KEY TECHNOLOGIES

Transmission electron microscopy image of carbon coated silicon nanoparticles to be used as advanced anode materials in Lithium ion batteries (by Nanomakers, upscaling project SIRIUS)

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EIT RawMaterials Vision & Mission

Europe is home to world leaders in manufacturing, game changing innovative technologies and an entrepreneurial infrastructure that can boost the transition to a resource-efficient and sustainable society. A sustainable supply of raw materials is vital for both this transition and for Europe's industrial activity.

The vision of EIT RawMaterials: 'To develop raw materials into a major strength for Europe' will be realised by integrating knowledge from industry, higher education and research and by engaging stakeholders from the entire raw materials value chain. EIT RawMaterials will promote increased resource efficiency and the improvement of processes and products, support the introduction of new, innovative technologies and rethink our current linear economic model to move towards a circular approach. Further focus areas are to increase human capital in the raw materials sector and promote entrepreneurial education at all levels.

We see a Europe with industrial strength built on a foundation of efficient, secure and sustainable supply and use of raw materials. In this vision, products, processes and solutions are geared towards the closure of closely interconnected material cycles. These dynamic and rapidly changing material cycles will attract new investments, enhance the innovation capacity for competitiveness and incite the interest of talented, skilled, entrepreneurial employees. The aim is for society as a whole to appreciate the value of raw materials and perceive the sector as innovative and attractive.

The mission of EIT RawMaterials is: 'To boost the competitiveness, growth and attractiveness of the European raw materials sector via radical innovation, new educational approaches and guided entrepreneurship'.

Solving Material Issues for Key Technologies

A key element of human nature is the ability to exploit and design materials to fulfil certain purposes. In our modern age, cost and optimised performance have been the key drivers to find substitutes for existing solutions. Scientists and engineers have learned to make use of almost every element in the periodic table to create ever more complex materials for specific applications. In recent years, awareness of the substitution of toxic and resource critical materials has grown.

An increasing number of biological compatibility studies have raised concerns regarding the use of certain specific kinds of material. Investigations into the resource criticality of materials, i.e. their economic importance, supply risk, and environmental footprint, have shown that there may be bottlenecks in materials supply, both for the production of current key technologies as well as the breakthrough of emerging ones. The shift towards renewable energies, e-mobility, and Industry 4.0 are examples of extensive innovation processes that trigger the need for new kinds of advanced materials. Substitution is an intervention into an industrial ecosystem that brings great potential for new businesses and economic growth.

Within this context, EIT RawMaterials has identified substitution as a pillar of its strategy to turn raw materials into a major strength for Europe. The substitution of resource critical, toxic and low performing materials is considered at elemental, material, process, and system levels. The network supports innovation and business creation offering solutions and added value, particularly in the fields of sustainable mobility, energy, machinery, and ICT. The current portfolio encompasses projects on topics including energy storage, magnetic materials, hard materials, lightweight design, and materials and systems modelling. Innovative new services and business models that enable an optimised use of raw materials are also supported. These activities harmonise with education projects to encourage future experts in substitution-related fields and to raise awareness across wider society.

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World's Largest Community for Innovation in the Raw Materials Sector

EIT RawMaterials is a strong European community with **more than 100 partners** from leading businesses, universities and research institutions across Europe as well as numerous cooperating task partners and support partners. Partners of EIT RawMaterials are active across the entire raw material value chain; from exploration, mining and mineral processing to substitution, recycling and circular economy. The complementarities and diversity within the EIT RawMaterials community, combined with a strong focus on innovation, business and entrepreneurship, provide a novel collaborative consortium which enables breakthrough innovative developments and radical new ways of addressing raw materials challenges.

EIT RawMaterials Activities

A number of different activities carried out by the EIT RawMaterials community facilitate new technologies, research and developments to support the exploration industry. These activities are carried out via partnerships between industry, research and university partners of EIT RawMaterials.

Also involved in specific activities are external task partners, for example small to medium-sized private companies and international collaborating universities or research institutions. Activities are funded jointly by EIT RawMaterials and its partners.

NETWORKING & MATCHMAKING activities are carried out to stimulate internal links between EIT RawMaterials' partners as well as external links with other stakeholders and initiatives, both across Europe and internationally. The focus is on both more traditional partnerships as well as innovative partnerships with other parts of the value chain, such as recycling and design for a circular economy. Activities may range from the provision of investments and research funds, to facilitation of technology solutions for specific needs, up- and down-stream business networking, or the initiation of a student internship at an industrial partner.

ACCELERATION & VALIDATION activities ensure the development, demonstration and transfer of innovative processes, technologies, products and services towards the market. The majority of activities at EIT RawMaterials fall into this category. Activities cover innovative technology-focused demonstration and validation projects with a strong focus on new, radical innovation and business feasibility and application. Two types of projects are covered by these activities: Upscaling projects, which target a specific technology, product or service and aim to bring it to market, and Networks of Infrastructure, where expertise and infrastructure are made available to partners and external users for use in specific fields but with a wider application.

LEARNING & EDUCATION activities are carried out under an overarching brand and coordinating body known as "RawMaterials Academy". The Academy strives to educate the raw materials game-changers of the future, ensuring Europe cultivates a society of learners contributing to a strong and resilient EU raw materials base. Four domains of learning and education are addressed by EIT RawMaterials: Masters and PhD programmes strengthen students' technical expertise while fostering the entrepreneurial and innovation skills, knowledge and problem-solving mindset needed to ensure a sustainable future for the raw materials sector across the entire value chain. Lifelong Learning courses offer professional training which draws on expertise from all three sides of the Knowledge Triangle to respond to the industry's changing needs and remain at the forefront of innovation. Wider Society Learning projects raise awareness and build capacity of stakeholders including policymakers and government officials, civil society, school pupils and the general public. This calls for innovative ways of demonstrating the advancements, needs and opportunities in the raw materials sector in ways that encourage awareness and interest within multiple target groups.

BUSINESS CREATION & SUPPORT activities are carried out to encourage entre intrapreneurship within the exploration sector and help to generate novel business from innovative technologies, products and services, e.g. mapping customer needs, related market areas and business segments. This covers both funding and mentoring programmes for start-up companies, as well as booster-funding schemes for small and medium-sized enterprises. The focus is to develop and support companies in their growth into game-changing enterprises. These activities are driven by various EIT RawMaterials business competitions and support activities. The EIT RawMaterials community is utilised to enable international expansion through matchmaking with complementary stakeholders.

Partnership With EIT RawMaterials

EIT RawMaterials strength is its partners. As a partnership organisation the focus is on continuously benefitting from and strengthening the network, and to welcome also networking and collaboration with external stakeholders. The Core and Associate Partners are the 'owners' of the EIT RawMaterials; they have decision-making power and are the main participants in the activities.

Task Partners join actively in specific activities or projects. Task Partners have access to certain events and network benefits. This category is particularly relevant for the attraction and involvement of small to medium-sized enterprises (SMEs) in the community.

Support Partners are network organisations, trade associations, NGOs, public bodies, governmental bodies and/or other types of organisations which share the goals of the EIT RawMaterials and are willing to support its activities. In this category, regional branch organisations and SME networks and clusters have an important role to inform and attract their SME members to become active participants in the EIT RawMaterials.

EIT RawMaterials provides a unique community that can facilitate and support matchmaking activities, development of innovative technologies and business creation. Whether it is identifying challenges and needs in the sector or developing and demonstrating technologies, products and services that needs to be commercialised, these are opportunities for securing raw materials becoming a major strength for Europe.