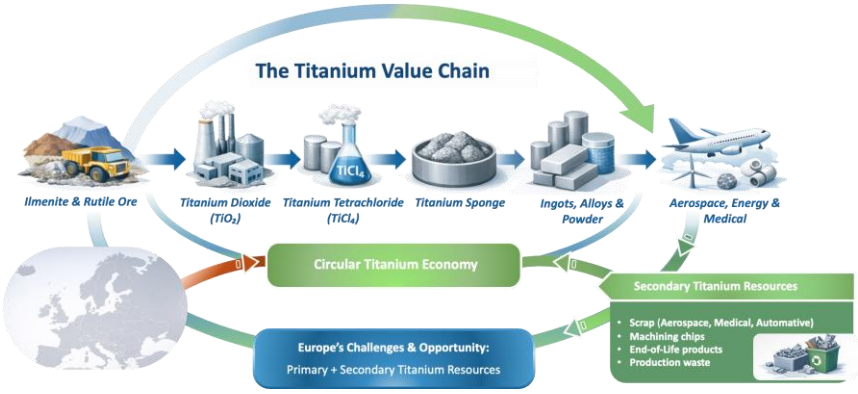
United Europe – a foundation for a rapid implementation of a sustainable and competitive titanium metal production

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The need for fast and efficient unified European policies was one important outcome of our "***Understanding the Titanium Value Chain: indispensable for high quality and traceable applications***" workshop, co-organized by the Horizon Europe projects Euro-TITAN, REPTiS, AVANTiS, and the European Powder Metallurgy Association at Euro PM2026 in Budapest, on 14th October. Presentations and Panel discussions with experts from industry and research organizations evidenced urgent needs to secure titanium metal production in Europe.



Titanium metal properties are indispensable in the aeronautic, energy, industrial and medical sectors. Thus, titanium metal demand is growing. Aerospace remains the primary consumer, expecting 40'000 new planes by 2045. End users stand behind an incomplete European-based supply chain from mine to titanium metal and metal powders. They are ready to pay a premium for European-sourced materials if security, lower carbon footprints, strict chemical consistency and stable prices are ensured. Downstream processing works on the next-generation of titanium powder production with 99% efficiency (1:1 Buy-To-Fly ratio). Material specifications (such as contaminants, mechanical and fatigue properties) are priority for safety and security wherever the source material comes from. Material traceability stops usually at the powder level.

Europe's opportunities

Europe's primary and secondary resources would be sufficient to meet the current and future titanium metal and alloys needs. Nevertheless, more than 50 % primary resources are exported to be processed outside Europe, as sponge and ingot producers are rare in our continent. Ti-metal alloys ingots, powders or ready-made products are then imported into Europe. Furthermore, secondary titanium resources, such as metallurgical residues, are landfilled and stockpiled at high costs, whereas they should be converted into resources. Additionally, both categories of titanium resources contain several other high economic value metals like scandium, zirconium, gallium, hafnium, which are crucial for European industries. The aim is to transform more resource material in Europe!

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Horizon Europe and EIT Raw Materials GmbH invest massively to set up a European value chains in critical metals. Progress is underway, but we must move faster! For example, Europe is increasingly recycling rare earth elements from permanent magnets at industrial scale (Nabeel Mancheri, EIT RM, during Euro PM2026 Plenary Session). For titanium, low-carbon technologies are being developed, which will be competitive on the market.

Europe's titanium resources

Europe's resources are the largest ilmenite deposit of the world, Titania in Norway can exploit +60 years reserves. World-class ilmenite resources are available in Ukraine. A multi-metal mining project (Ti, Mg, V) is under evaluation in Finland. Europe's secondary titanium resources are sufficient to produce Ti-metal and alloy powder from scrap and end-of life products, residual streams from bauxite residues and titanium dioxide pigment production residues. It is urgent to transform these resources into competitive products and to build industrial capacity scaled up to titanium metal industries requirements in Europe.
VELTA Holding and the REPTIS project show how this value chain can be built based on low-cost hydrometallurgical processing from ilmenite ore, while developing co-production of CRMs, so that these products can reach the market. Secondary resources, namely bauxite residues and Ti-dioxide residues are used to extract titanium in the EURO-TITAN project. Processing is at pilot stage and can start with clean hydrogen reduction followed by hydrometallurgical and/or electrochemical processing, e.g. the FFC-Cambridge process, to obtain metal powder. Downstream processing is on the way to the next generation of titanium powder production with 99% efficiency (1:1 BTF).

Reuse of non-melted titanium powder is possible. Scrap streams (e.g., T-5 chips for Al-Ti master alloys, iron-contaminated scrap for ferro-titanium) are recycled. However, the overall titanium market size and expanding aerospace production cannot be covered through current recycling capacities. Recycling efficiencies must be improved keeping scrap material in Europe, optimizing scrap collecting and sorting.

The most urgent task is to guarantee investments in titanium projects having reached pilot scale to achieve industrial capacity in Europe. One solution is implementing shared-risk funding models, joint ventures, and minimum price guarantees to bridge the gap between pilot-scale validation and commercial deployment. Plant implementations can be close to resources or reusing abundant industrial sites.

Europe's competitive advantages

At European level, clear strategies and political decisions are required, with a holistic view on the titanium value chain, to build up titanium metal, titanium alloy (powder) production, and to regain leadership in titanium dioxide pigment production which is currently eroded and undermined.
Priorities should be mandating metallurgical residue processing. Extraction of all critical metals from primary and secondary resources and designing customized alloys for

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European industries, will be a competitive advantage. Industrial Symbiosis is the key for that purpose, considering IP preservation and risks related to security.

Titanium product stockpiling should ideally reach 12 months for large, mid- and small sized companies to prevent production interruption. A centralized EU titanium sponge or metals stockpile is not recommended as end users need customized products and their own material specifications. As an example, Airbus ensures 12 months of supply of titanium to prevent production suspension. Small and mid-sized companies have three to six months of inventory. Financing additional six-to nine months of stocks through European bodies (e.g. European Raw Material Alliance (ERMA), Emerging Markets Transition Investment (EMTI), or EIT RawMaterials) would be a vital contribution. There is no need of creating new institutions or organizations.

Additionally, European titanium products will be competitive when considering and monetizing hidden external costs (e.g. environmental damages) compared to external cost of conventionally high-carbon footprint produced Ti-metals. Moreover, introducing EU-level life-cycle assessment or carbon footprint taxes can counter low-cost Asian imports that strain European pigment production (e.g., Venator, Kronos) and future metal producers.

Thank you to all presenters and panelists, to the audience in Budapest, to organizers, and to the European Commission for financial contribution from the REPTiS, Euro TITAN and AVANTiS projects, that made this workshop possible in the frame of Euro PM2026.

Presenters, panelists and moderators

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