Valorising emissions from steel making into sustainable products

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Johnson Matthey (JM), a global leader in sustainable technologies, is a partner of the INITIATE (*Innovative industrial transformation of the steel and chemical industries of Europe*) project consortium. The consortium will investigate the potential of a novel synergetic and circular process that transforms residual carbon-rich gas from the steel sector into resources for high purity urea.

The European Union has awarded 21 M€ to enable the demonstration of such an industrial symbiosis concept between the steel and chemical industries.

To reach EU climate targets, the steel and iron production sectors are looking to decrease their CO_2 emissions by up to 90% by 2050. INITIATE will demonstrate how residual carbon-rich gases, such as blast furnace gas and basic oxygen furnace gas, from the steel sector can become a valuable feedstock for the chemical sector, leading to a cost-efficient decarbonisation of the steel industry. The demonstration will combine the continuous production of N_2+H_2 and CO_2 streams, with the innovative ammonia production as a precursor for urea. Urea has important uses as a fertilizer and feed supplement, as AdBlue® (Diesel Exhaust Fluid), as well as a building block for the manufacture of pharmaceuticals and plastics. The project will also conduct a macro economic and life cycle analysis to ensure the sustainability of the process and develop a commercial deployment roadmap for technology roll out.

With expertise in a wide range of process catalysts, absorbents, and licensed technologies related to the syngas and ammonia industries, JM is well positioned to support the INITIATE project. JM's role will be to evaluate the suitability of functional catalytic and purification materials to produce urea from residual gas streams as well as support the demonstration of sustainable development and eco-innovation on a pilot plant scale. Together with the project partners, JM will work on the commercial implementation plan and devise business models and strategies. Driven by key global sustainability trends, enabling the transformation of residual carbon-rich gas into resources for urea production, at a significantly reduced carbon footprint, fits well with Johnson Matthey's vision for a cleaner healthier world, today and for future generations.

The consortium consists of functional material suppliers (Johnson Matthey and Kisuma Chemicals), major steel, urea and energy transition industrial players (Arcelor Mittal, SSAB, Stamicarbon, and NextChem), multi-disciplinary research organisations (TNO, SWERIM, Politecnico di Milano and Radboud University Nijmegen) and experienced promoters of carbon capture and utilisation, circularity and industrial symbiosis topics (CO_2 Value Europe). The project builds upon the infrastructure and knowledge developed from previously supported European and national projects aimed at enabling a low-carbon economy, including STEPWISE in which JM was a project partner, FReSMe, ERANET-ACT ELEGANCY, and BOF2UREA.

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