REPOST
Recycling Cluster Aerated Concrete:
Subproject 4: Dicalcium silicate from autoclaved aerated concrete residues from demolition

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Partner:

- Xella Technologie- und Forschungsgesellschaft mbH, Kloster Lehnin
- Otto Dörner GmbH, Hamburg (recycling company)
- Institute of Industrial Management and Industrial Production (IIP), KIT

REPOST develops new options for resource-efficient, high-quality and economical recycling of aerated concrete residues from the demolition of buildings in the production of building products. With respect to subproject 4, the Resynergy process is used to convert demolition residues from aerated concrete into dicalcium silicate (C_2S, belite). The dicalcium silicate in turn serves as a precursor for the production of new aerated concrete blocks by the partner Xella.

The advantages of the Resynergie process are low energy consumption, the possibility of separating valuable and harmful substances and a very homogeneous and high-quality product. Carbon Capture is available as an option at low cost.

The Resynergy process has been developed and tested on a laboratory scale in a continuously operating laboratory rotary kiln. A large pilot is planned. Various primary and secondary feedstocks have been used and optimized. Examples of secondary feedstocks are fly ash from hard coal and lignite power plants, flotation residues from ore processing and various slags. The complex composition of secondary raw materials requires balancing and detailed description of element-specific material flows in the calcination process. These data are essential for the plant design and the optimization of the respective process parameters in the coupling of raw material preparation and calcination.

In the project, various recycling options are modelled in a comparative system analysis and evaluated techno-economically and ecologically over the entire life cycle, taking into account the information, economic and regulatory framework conditions to be complied with.

The aim of the project is

- to enable the upcycling of aerated concrete wastes into high-quality binding agents
- to avoid the usual landfilling of these wastes
- to reduce the CO_2 footprint through circular economy
- to demonstrate the overall economic and ecologic feasibility

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