

## **Circular bio-based intelligent organic and oxide engineering ecosystems - From multiple heterogeneous sources to homogeneous high-tech materials supply streams (Circular B-I/O)**

Initiative: Zirkularität mit recycelten und biogenen Rohstoffen

Ausschreibung: Kooperationsprojekte

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Laufzeit: 4 Jahre

Currently, petrochemical products and industrial residues are used for cement clinker reduction in concrete. However, they could be replaced more sustainably by unused bio-based agricultural and aquacultural by-products. Compared to industrial residues, however, bio-based residues occur widely dispersed in multiple small deposits and are subject to seasonal fluctuations. Thus, many small heterogeneous material streams must be bundled into a few homogeneous supply streams for the construction industry. The project aims to close this gap and investigates the necessary ecosystems linked to the technological conversion of bio-based by-products to high-performance building material constituents, both before the conversion and in the subsequent utilisation in materials and structures. Decision-making systems supported by artificial intelligence will be developed to assess the technologically and socio-economically most sustainable use and to optimize mineral oxides as cement substitutes. The concepts developed in the Kenyan pilot will be extrapolated to the European frameworks and raw materials. The overall goal is to develop sound policy advice for the worldwide application.

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