

# Upcycling Engine Oil into Concrete

 Energy & Environment

 Manufacturing

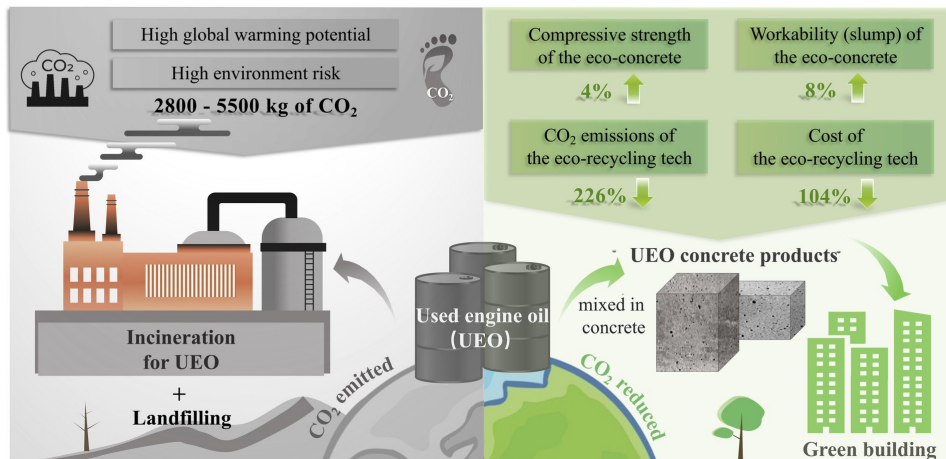
Buildings and Construction Technology

Nanotechnology and New Materials

Waste Treatment/Management

## Cementing a Sustainable Future:

Used engine oil enhanced low-carbon concrete products for long-term decarbonization



IP Status  
Patent filed



Technology Readiness  
Level (TRL) ?

6

## Opportunity

As worldwide urbanization and industrialization proceed, the accumulation of used engine oil (UEO) - approximately 8 million tons per annum - poses a significant global challenge to the environment through soil contamination and water pollution. Current UEO disposal methods of incineration and landfilling are carbon-intensive and environmentally harmful. The incorporation of UEO into concrete as a chemical admixture is a highly potential solution, since concrete-based construction requires a significant amount of raw materials, about 10 billion tons annually. This invention offers a clean and promising waste management strategy for UEO disposal, enabling long-term decarbonization in the waste management sector and contributing to the development of sustainable and durable concrete for large-scale implementation in the construction industry.

## Technology

The proposed technology aims to recycle UEO by incorporating it into concrete to develop sustainable and durable construction materials. To achieve this, a typical high range water reducer and supplementary cementitious materials are used to improve the dispersion of UEO in the cement mixture and optimize the porosity of the resulting UEO concrete, respectively. The UEO disposal or UEO concrete manufacturing process involves mixing the UEO with water-reducing admixtures to produce a well-dispersed mixture, then adding it to the concrete mixture. By adding a high

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Develop  
Concept

Proof  
Concept

Build Value

dosage of UEO, i.e., 5% by mass of cementitious materials, to the concrete mix, the resulting UEO concrete can achieve similar or better mechanical properties and dense microstructure compared to control groups. This method provides an eco-friendly solution to UEO disposal while improving the workability, durability, and strength of the resulting material.

## Advantages

- Innovative and low-carbon waste management strategy.
- Workable, strong, durable, sustainable waste-enhanced concrete products.
- Large-scale implementation of UEO concrete products in the building industry.

## Applications

- Infrastructures such as long-span bridges and high-rise buildings in the building sector.
- Waste disposal solution in the waste management sector.

