

High Performance and CO2 Consuming Living Wood for Buildings

Bio-inked microorganisms turn wood into a strong, carbon-sequestering, self-healing building material.

Natural wood, once processed as building material, loses its carbon capturing capacity and becomes vulnerable to decomposition as well as weathering, limiting the use of wood for industrial and commercial applications. Researchers at Purdue have developed "living wood", a new type of wood composite material to be used as high strength building material and sustainable construction. The current methods for wood processing to allow for high mechanical strength involve the use of either wood composite or wood treated to minimize porosity, both of which have their drawbacks due to either a damaged structure that requires additives or heavy use of chemicals with a large carbon footprint. The proposed "living wood" will use the wood composite technology but will transform the dead wood into a new living, strong, carbon capturing and self-healing composite by incorporating microorganisms within the wood as bioinks.

Technology Validation: Researchers have shown that the proposed living wood can sequester 12 kg atmospheric CO₂ per functional unit while emitting 1.7 kg fossil CO₂, compared with 120 kg fossil CO₂ emission for the concrete building of the same functional unit.

Advantages:

- Reduces carbon footprint and improves sustainability metrics
- Employing active and smart technology for fillers of the wood scaffold

Applications:

- Replace non-renewable structural components in buildings (e.g. steel and concrete)
- Reinforces load bearing of wood structures, increases fire resistance and lifetime

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Category

Materials Science &
Nanotechnology/Composites &
Hybrid Materials

Further information

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- Lowers technological barriers to manufacturing uniform wood composite materials

TRL: 4

Intellectual Property:

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