

DENATURE

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In Collaboration with

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DeNAture is a physical coding system for a faster and more accurate identification of invisible materials information in a closed loop chemical recycling system [TT1](#). The project demonstrates how design thinking can be applied in different contexts to aid systems for cyclability through compelling communication strategies of materials' provenance, type, processes, recycling and life-cycle [TT2](#). The project is the outcome of a science-design collaboration during a COST-funded design residency in a laboratory hosted by Hanna de la Motte, a technical scientist developing innovative methods for chemical recycling of materials including regenerated wood-based cellulose fibres at Chalmers University of Gothenburg and SP Technical Institute of Sweden [TT5](#).

To aid the traceability of materials at their smallest scale within chemical recycling processes, a code for man-made fibres is developed as a hybrid between DNA coding in living organisms and binary codes in programming [TT6](#): Materials that are derived from nature but altered in the process of manufacturing reveal a traceable code that translates the invisible chemical processes and compositions into a pattern that can be read with UV microscopes and sensors [TT3](#). This speeds up identification and application of the correct chemical processes through the connection of scientific research with design, and is achieved without altering the properties of the fibre [TT9](#).

Acknowledging scarcity of materials and a system-based design approach that can be applied from the micro (molecular) to the macro (textural) scale, a garment blueprint made from 100% regenerated cellulose (Viscose and Tencel) creates options for assembly and disassembly of valuable coded fibres with a 'minimal material' approach [TT8](#).

The data of coded materials is presented in a Recyclopaedia that provides a visual archive for the research that is pioneered worldwide. These codes create the fingerprint for each material, and like tree rings more layers of information can be added over time [TT10](#).

TED strategies

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