



PolyUrethane Recycling Towards  
a Smart Circular Economy

# Deliverable

D4.1 First CAPU foam showing acceptable mechanical properties (stable, flexible to the touch, resilient) and good reprocessing to elastomer.

WP4 – WP Smart Design – CAPU foam and its reprocessing

### Project Information

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## Publishable Summary

This deliverable concerns the introduction of CAPU co-monomers into foam formulations. The focus was on obtaining good foam samples on lab-scale. The final openness of the foam and its comfort properties (hardness, resiliency, ...) were also targeted to be as close to normal PU comfort foams.

Incorporation of CAPU co-monomers in thermoset PUs at a 1-20 wt% doping level was targeted to introduce the desired dynamic properties.

The foams with the readily available non-TAD-based alternative CAPU monomers were optimised to obtain foams with relatively good mechanical properties (density, hardness, ...). The foams also feel very comfortable to the touch. A maximum replacement of the polyol by the CAPU comonomer of 15 parts (10% wt) could be achieved maintaining comparable properties to a standard PU foam. Higher incorporation percentage could not be achieved thus far due to the different reactivity of the CAPU comonomer. Nevertheless, these foams did show good reprocessing to elastomers for two cycles (1. Foam to elastomer; 2. Elastomer to elastomer).

The foams with the TAD-indole adduct CAPU monomer were thus far only made on a small-scale basis. The first screening showed that it is possible to foam with this adduct, due to the optimized foaming compatibility of these monomers (described in D1.3), but the obtained foam has so far no good mechanical properties compared to the standard PU comfort foam. A more flexible foam will be targeted by performing small variations of the monomer structure. Nevertheless, the reprocessing of those foams could also be shown, showing the potential of the TAD CAPU-Foams.