



PUReSmart

**PolyUrethane Recycling Towards
a Smart Circular Economy**

Milestone

MS2 First TAD-indole CAPU comonomers are available for foam testing
WP1 – CAPU co-monomers

Project Information

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Publishable Summary

This milestone describes the scalable synthesis of triazolinedione (TAD) and indole based CAPU comonomers which can be used directly into polyurethane foams. Previously available comonomers, which have been published in the literature, required lengthy synthetic protocols and chromatographic separation. In addition, the known TAD/indole adducts were often solids, which can only be solubilized in organic solvents, which precluded their further studies in industrially relevant polyurethane materials, such as polyurethane foams. In order to show potential industrial relevance, a range of selected and redesigned comonomers can now be readily produced on larger scales offering compatibility with existing polyurethane formulations and monomers. Physicochemical compatibility of these new TAD-indole PU comonomers is addressed via an industrially known technique.

In summary, this milestone reports first available TAD/indole based comonomers on a scale allowing for the production of polyurethane foams that would constitute a covalent adaptable network. The study of such covalent adaptable polyurethane (CAPU) foams is now enabled by resolving the synthetic as well as the compatibility issues. This milestone represents a major step to incorporate the TAD/indole-based dynamic chemistry platform into polyurethane foam applications, now offering sufficient quantities to conduct a comprehensive study in standard PU foams as well as allowing further offers options for structural refinements yielding various PU formulations.