



ADVANCING BIO-BASED MATERIALS: INTEGRATING MODULAR BIOBRICKS FOR INNOVATIVE PRODUCTION SOLUTIONS

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TRANSITION TOWARDS **SUSTAINABLE PRODUCTION** DEMANDS INNOVATIVE **BIO-BASED MATERIAL SOLUTIONS** TO ADDRESS CURRENT SOCIETAL AND INDUSTRIAL CHALLENGES.

BIOTECHNOLOGY
and
BIOENGINEERING

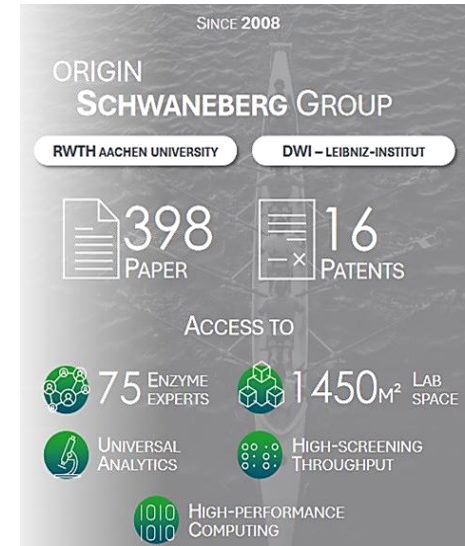


Prof. Dr. Ulrich Schwaneberg

Chair for Biotechnology, RWTH Aachen University



Quality Enzyme Solutions



ARTICLE | Open Access |

Matter-tag: A universal immobilization platform for enzymes on polymers, metals, and silicon-based materials

Sarah Dedisch, Annika Wiens, Mehdi D. Davari, Dominik Söder, Cesar Rodriguez-Emmenegger, Felix Jakob, Ulrich Schwaneberg

First published: 24 September 2019 | <https://doi.org/10.1002/bit.27181> | Citations: 39



Chem Soc Rev

REVIEW ARTICLE

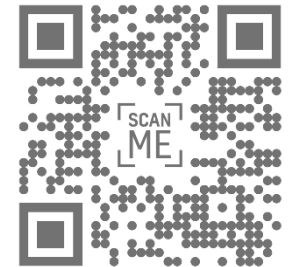
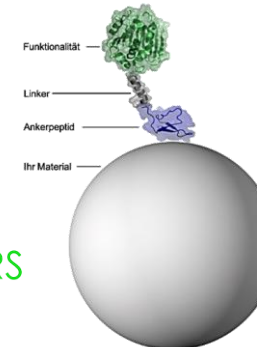
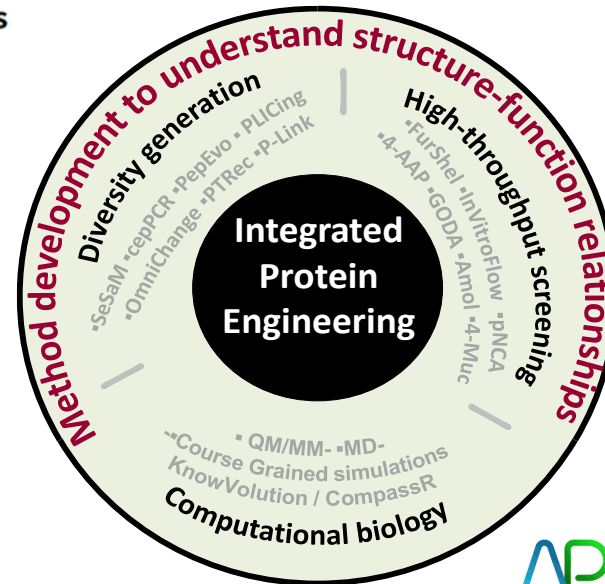
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Cite this: *Chem. Soc. Rev.*, 2024, 53, 6445

Material-specific binding peptides empower sustainable innovations in plant health, biocatalysis, medicine and microplastic quantification

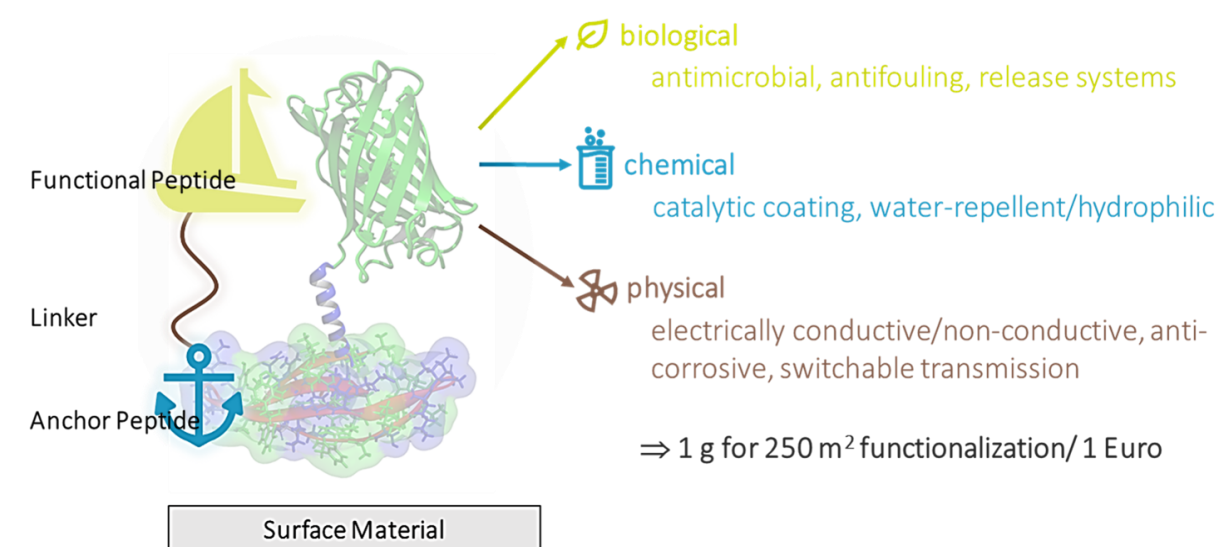
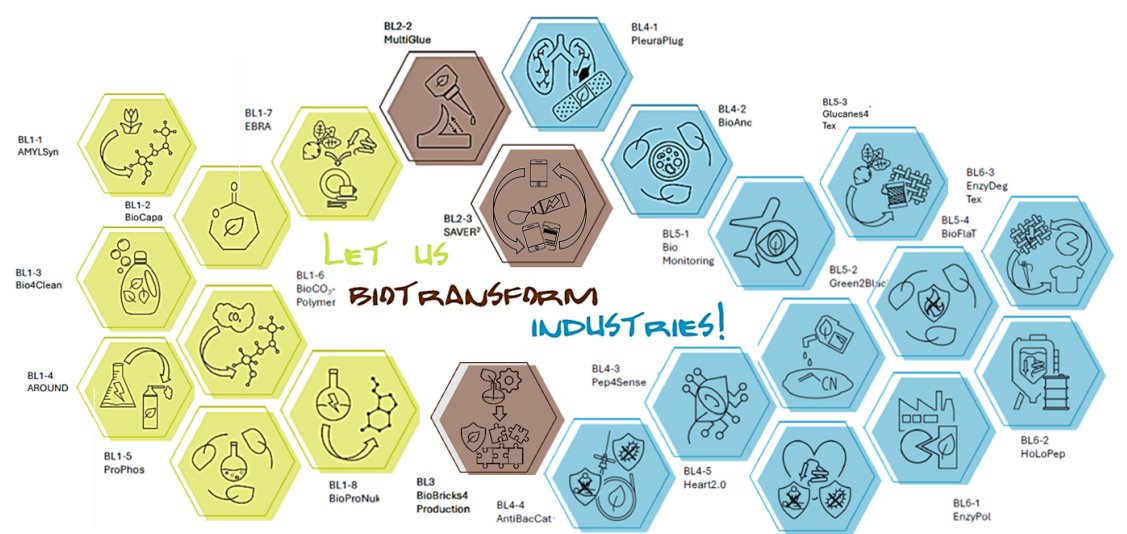
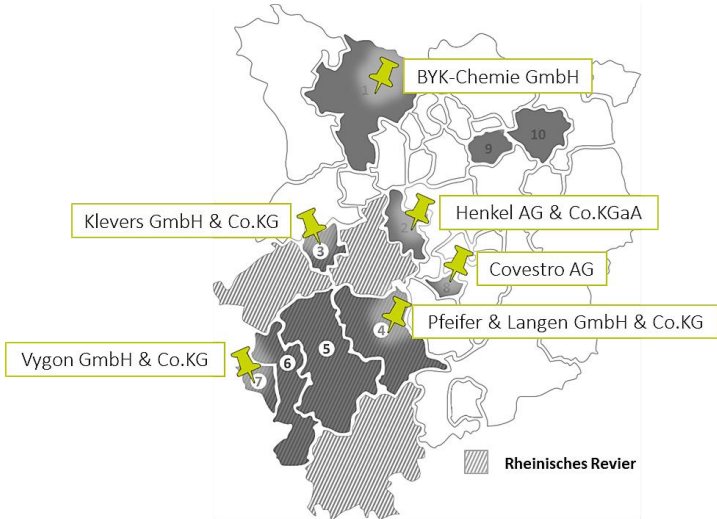
Maochao Mao, ¹ Leon Ahrens, ¹ Julian Luka, ¹ Francisca Contreras, ¹ Tetiana Kurkina, ² Marian Bienstein, ² Marisa Sárria Pereira de Passos, ² Gabriella Schirinzi, ² Dora Mehn, ² Andrea Valsesia, ² Cloé Desmet, ² Miguel-Ángel Serra, ² Douglas Gilliland ² and Ulrich Schwaneberg ^{1*}



ADVANCING BIO-BASED MATERIALS INTEGRATING MODULAR BIOBRICKS FOR INNOVATIVE PRODUCTION SOLUTIONS

A PREREQUISITE FOR A BIOTECHNOLOGIZED/BIOECONOMIZED PRODUCTION IN A **SUSTAINABLE CIRCULAR ECONOMY** IS THAT (ESTABLISHED) PRODUCT CONCEPTS ARE **RETHOUGHT IN A SUSTAINABLE WAY** TO HARNESS THE NEXT SCIENTIFIC AND INDUSTRIAL DEVELOPMENT STAGE AND ITS FUTURE-ORIENTED POSSIBILITIES FOR INDUSTRIAL ADDED-VALUE.

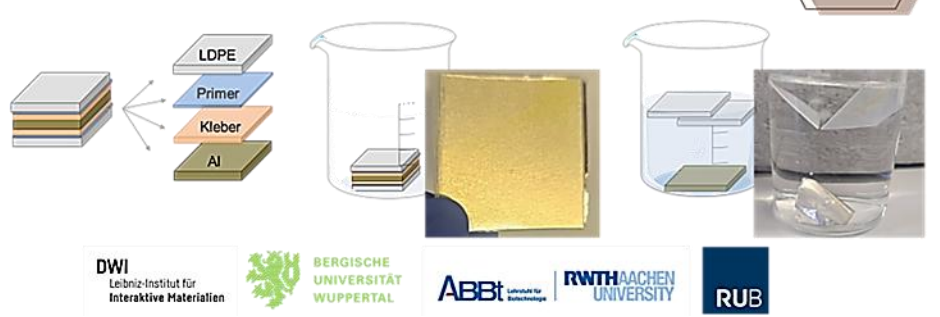
BIOFUNCTIONAL BUILDING BLOCKS SUSTAINABLY TRANSFORM MATERIAL FUNCTIONALIZATION
 - REPLACE EXISTING PETROCHEMICAL TECHNOLOGIES AND TOXIC FUNCTIONALIZATIONS &
 ENABLE NEW RECYCLABLE PRODUCTS/MATERIALS WITH HIGH ADDED VALUE -



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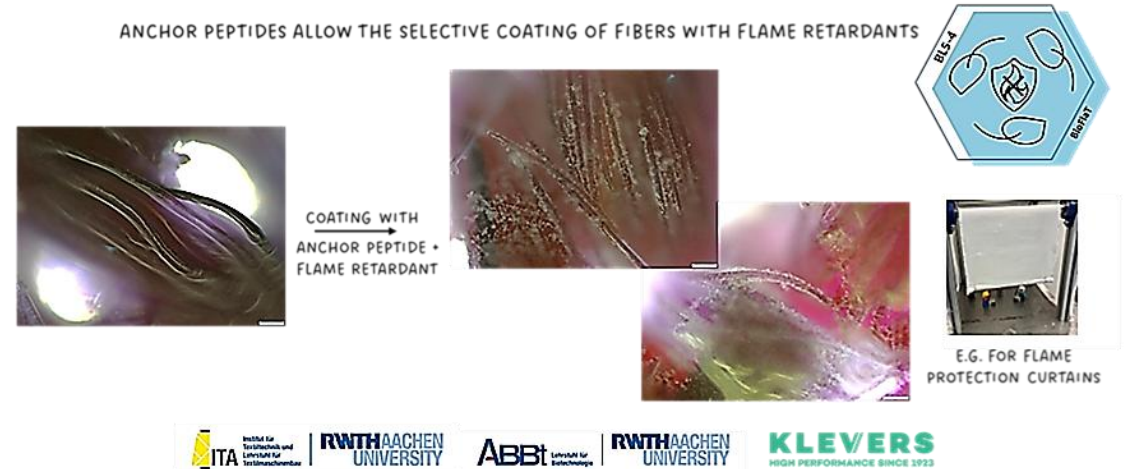
BL2-2 MULTIGLUE: TETRAPAK RECYCLING WITH WATER SWITCH ENABLES UNMIXED RECYCLING

"DUE TO THE MISERABLE RECYCLING RESULT OF ONLY AROUND 30 PERCENT, THE RESOURCE AND CLIMATE BALANCE OF THE BEVERAGE PLASTIC CARTON DETERIORATES CONSIDERABLY COMPARED TO THE INDUSTRY'S CLAIMS."
BARBARA METZ, DEPUTY FEDERAL MANAGING DIRECTOR OF DUH



BL5-4 BIOFLAT: BIOHYBRID FLAME RETARDANT FOR TEXTILES

ANCHOR PEPTIDES ALLOW THE SELECTIVE COATING OF FIBERS WITH FLAME RETARDANTS



BL2-3 SAVER²: REVERSIBLE BONDING WITH ELECTRIC CURRENT

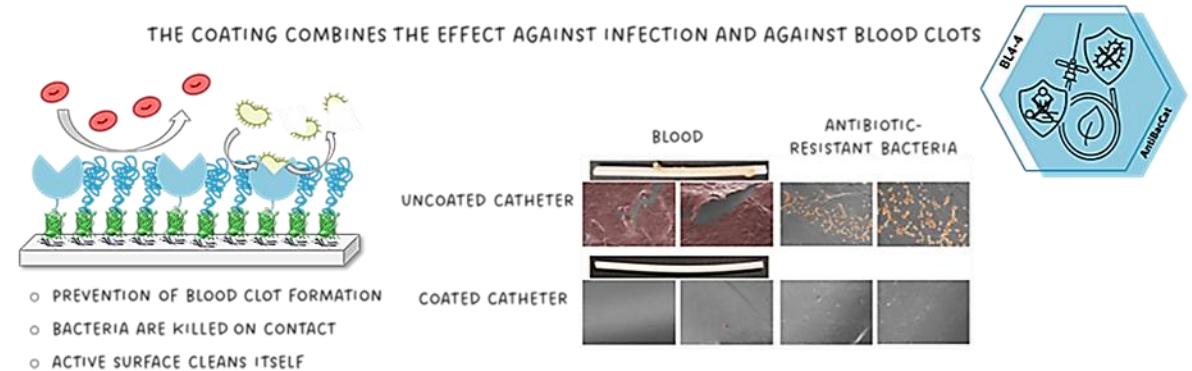
THE ADHESIVE BOND IS RELEASED BY APPLYING TENSION



- APPLYING VOLTAGE
- ELECTROCHEMICAL REACTION
- *DEBONDING*: CLEAN AND RELIABLE, BUT ONLY WITH ELECTRICALLY CONDUCTIVE BASE MATERIALS

BL4-4 ANTIBACCAT: PROTEINS AS ANTI-BACTERIAL COATING FOR MEDICAL APPLICATIONS

THE COATING COMBINES THE EFFECT AGAINST INFECTION AND AGAINST BLOOD CLOTS



- PREVENTION OF BLOOD CLOT FORMATION
- BACTERIA ARE KILLED ON CONTACT
- ACTIVE SURFACE CLEANS ITSELF



ADVANCING BIO-BASED MATERIALS INTEGRATING MODULAR BIOBRICKS FOR INNOVATIVE PRODUCTION SOLUTIONS

AIM TO DRIVE A 2.0 INDUSTRIAL BIOTRANSFORMATION BY FOSTERING PARTNERSHIP AMONG ACADEMIES AND INDUSTRIES ALIGNING TO EU'S GOALS FOR SUSTAINABILITY, RESOURCE EFFICIENCY AND CIRCULAR BIOECONOMY

WE SEEK PARTNERS FROM ACADEMIA, INDUSTRY AND SMES WITH EXPERTISE IN BIOTECHNOLOGY, MATERIAL SCIENCES AND CIRCULAR ECONOMY

TO CONTRIBUTE TO SCALING BIO-BASED MATERIAL INNOVATIONS, SHARING ADVANCED PRODUCTION TECHNOLOGIES OR EXPLORING APPLICATIONS IN HEALTHCARE, ENVIRONMENTAL MONITORING/REMEDIATION AND CLEAN PRODUCTION TECHNOLOGIES.

We joined efforts to past EU R&D&I projects "ROBOX" (H2020) advancing biocatalysis for industrial processes, "PACMEN" (MSCA-ITN) accelerating metabolic engineering network, "OXYTRAIN" (MSCA-ITN) investigating oxygen-sensitive enzymes for biocatalysis, and "MIX-UP" (H2020) transforming plastic biodegradation and waste treatment. Currently, we are contributing to "COMENZE" (HORIZON-MSCA) developing enzymatic strategies for eco-friendly polymer design.

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Bi4MatPro

Kompetenzzentrum zur Biologischen Transformation
der Materialwissenschaft und Produktionstechnik

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GEFÖRDERT VOM



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