Team Advanced Bonding
Wood Kplus & BOKU - Tulln
„Advanced Bonding“ Team 2018

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Research interests

Bonding is the basis for all wood composites as adhesion and cohesion contribute to their mechanical stability. The team Advanced Bonding investigates adhesives and wood adherent properties. New adhesives, also based on renewable raw materials as well as ideal bonding systems for novel wood composites, wood surface properties, adhesive distribution are investigated & developed.
Wood surface properties

Advanced Atomic Force Microscopy techniques to characterize and understand physical and chemical surface properties on small length scales

Frybort et al. (2014) Colloids and Surfaces A
Adherent - adhesive interaction
Micromechanical and surface properties

- Cross section of a halved wood fiber embedded in PUR with nanoindents

Micromechanical properties of adhesives, adherents and interfaces
Technological properties of adhesives

Adhesive – wood interactions
wetting, cold tack, curing, additives

• Torque for MUF at 43°C HDF
  surface temperature influenced by
different relative humidities of the
surrounding air
Adhesive distribution

- Schematic picture (left), Particle board (middle), MDF (right)

- Mahrdt, Hogger, van Herwijnen, Giesswein, Mitter, Kantner, Moser, Gindl-Altmutter *Holztechnologie* 2018,
Adhesives from Renewable Resources

Lignin based adhesives

- Cooking and testing of novel resins
Adhesives from Renewable Resources

Protein cylinder (dark blue) and Crosslinked protein cylinder (light blue) in hot water
van Herwijnen, Krug, Mäbert, Büttner, Jacob, Pietzsch Holztechnologie 2016, 57(1), 12.

Starch and protein based adhesives

- Wood foam: board
  - van Herwijnen, Krug, Mäbert, Büttner, Jacob, Pietzsch Holztechnologie 2016, 57(1), 12
  - D'Amico, Müller EP 2615209 2013
Adhesives from Renewable Resources: Other applications

Alternative binders for mineral wool
Bonding systems for novel wood composites

Adhesives for novel applications with special mechanical performance, foaming properties, swelling modification...

Example: Macro-fiber boards
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