Kompetenzzentrum
Niedersachsen • Netzwerk
Nachwachsende Rohstoffe
und Bioökonomie e.V.
3N

Interreg
Deutschland – Nederland

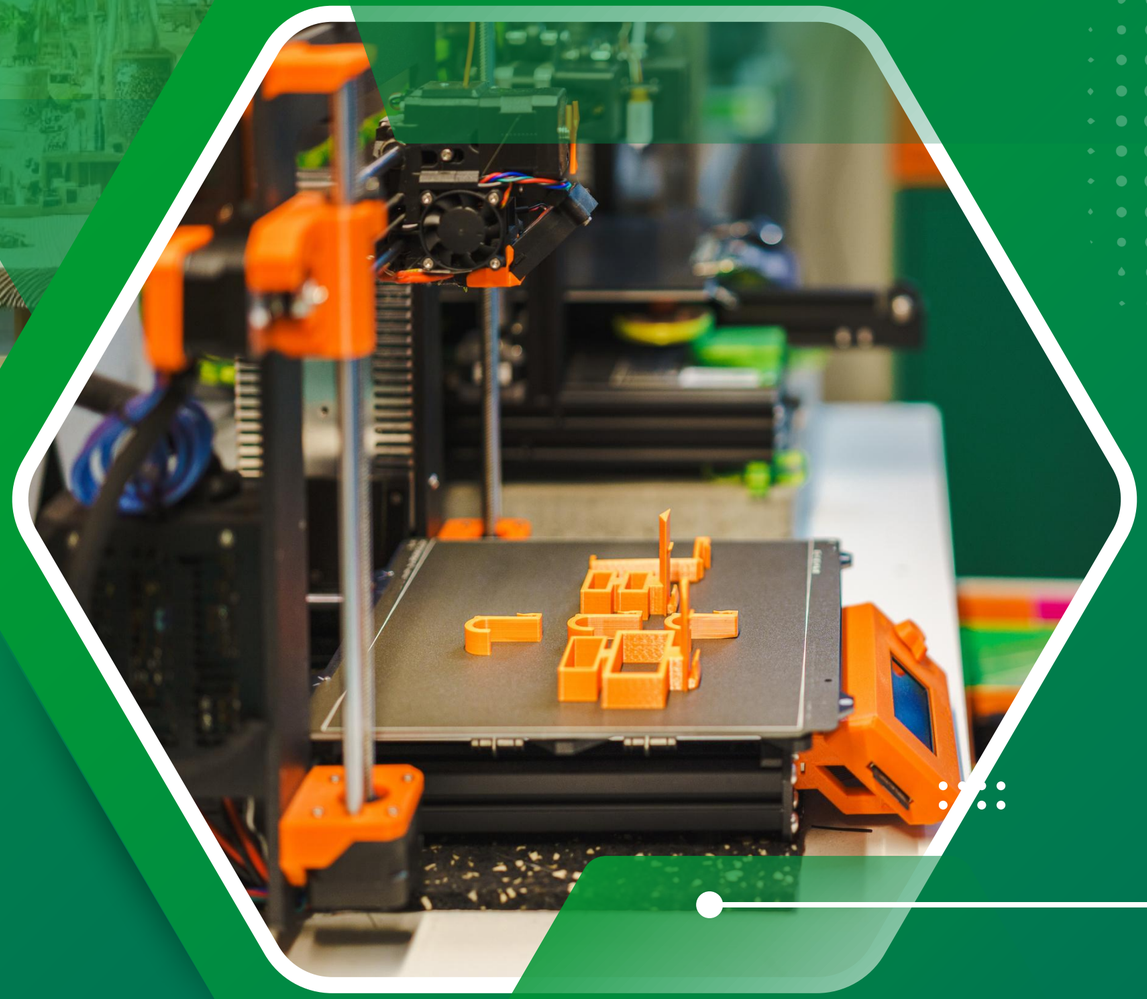
(Ko-)finanziert von
der Europäischen Union
(Mede) gefinancierd
door de Europese Unie

EMPHATI



EMPHATI

Biopolymers based on PHA



Presented by: Pascal Gerlach

More Information → www.3-n.info

Topics

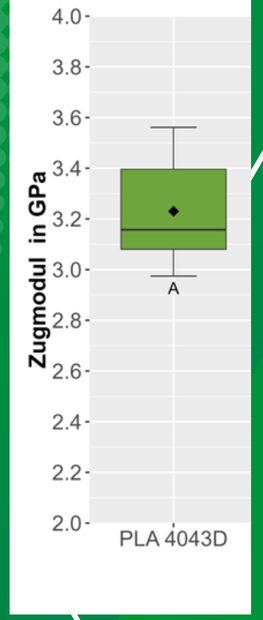
- PHA
- Challenges due to properties
- Overcome the challenges with process parameters
- PHA Academy

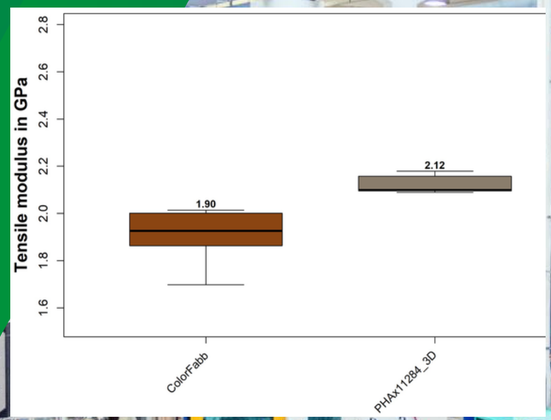


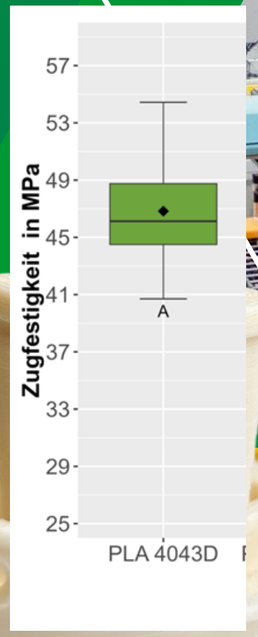
Properties

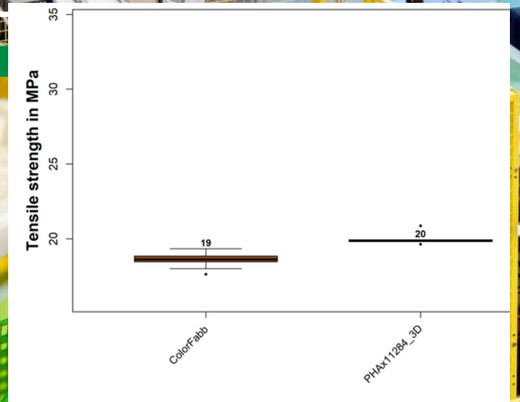
- Elongation at break - Product ist more brittle than an injection moulded part
- Crystallisation at room temperature
- small process window
- degredation starts just above melting point
- High MFI
- Agglomeration of particels

100% Bio- (degradable)









Applications









Challenges due to properties

- High MFI -> liquidous melt
- Poor overhangs or over support surfaces
- High contact area with build plate

  Reheating needed
- Even if the polymer is foodsafe the

  product is not





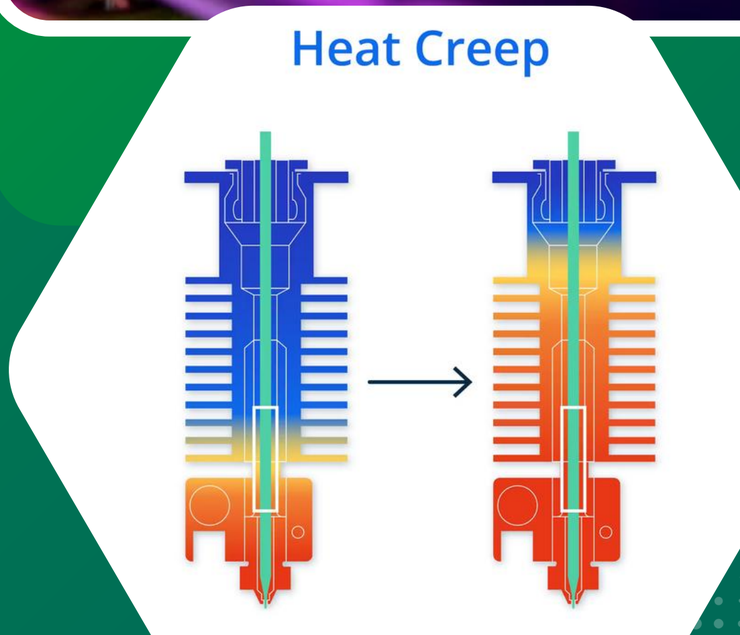


Challenges due to properties

- Heat Creep Clogging -> long dwell time in the heat block induces heat creeps
- Degradation due to long dwell time
- Agglomeration of filler material -> clogging of the extruder
- Small process Window
- Crystallization after print







compatible_printers_condition, notes, gcode_flavor, use_relative_e_distances, use_volumetric_e, extrusion_axis, printer_notes, before_layer_gcode, after_layer_gcode, between_objects_gcode, color_change_gcode, toolchange_gcode, before_layer_change_gcode, after_layer_change_gcode, start_gcode, end_gcode, extrusion_multiplier, filament_diameter, nozzle_diameter, extrusion_width, first_layer_extrusion_width, perimeter_extrusion_width, infill_extrusion_width, solid_infill_extrusion_width, top_infill_extrusion_width, support_material_extrusion_width, bridge_flow_ratio, bridge_overlap, bridge_speed, layer_height, first_layer_height, top_solid_layers, bottom_solid_layers, perimeters, seam_position, seam_gap, seam_angle_cost, avoid_crossing_perimeters, detect_thin_walls, fill_pattern, fill_density, fill_angle, fill_overlap, fill_smooth_distribution, solid_infill_below_area, only_infill_where_needed, infill_before_perimeters, solid_infill_every_layers, perimeter_speed, small_perimeter_speed, 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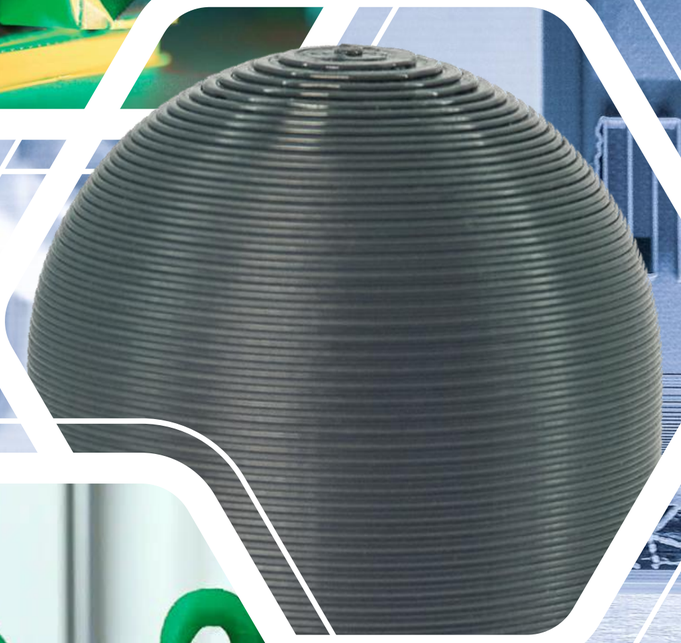
Overcome the challenges

with the process

- **Use high performance heat breaks**
- **Avoid retracts**
- **Find the process window**
- **High cooling -> cold bed -> fans 100%**









Overcome the challenges

with the process

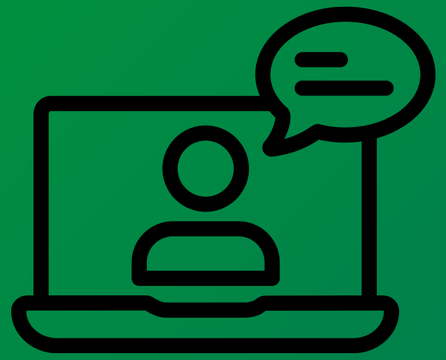
- **Use a brim to hold down your print**
- **Avoid thick material sections in your part -> Part optimization**
- **Make overhangs printable -> Part optimization**
- **If you want a foodsafe part -> make your process foodsafe -> add postprocessing**



Much more to cover in our

PHA Academy











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Thank You

For your attention and participation



Pascal Gerlach

More Information → www.3-n.info