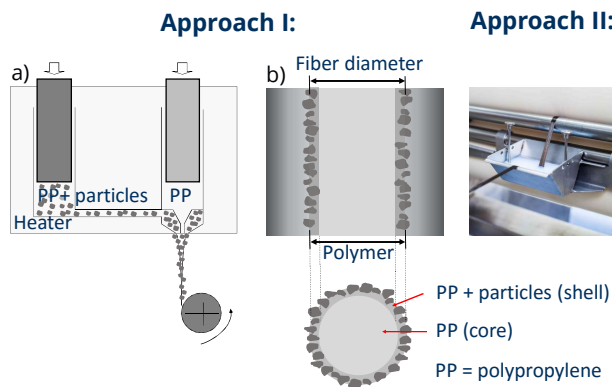


Mihaela-Monica POPA – Doctoral Project A2/II

FIBER AND INTERPHASE MODIFICATION FOR ENERGY ABSORPTION AT HIGH STRAIN RATES

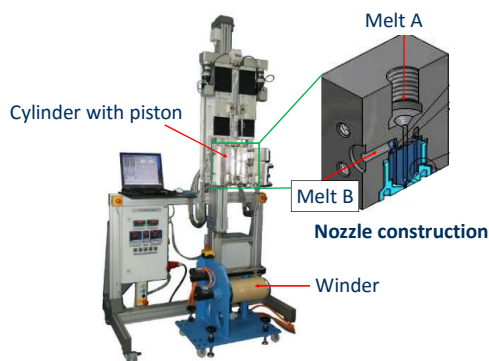
1 STATE OF THE ART

- High fiber strength combined with high surface roughness for introduction of slip-hardening by increased mechanical interlocking and plastic polymer deformation during crack bridging
- Design strategies for further fiber development: introduction of particles in the outer layer/skin through melt-spinning (approach I) or coating (approach II)



2 OBJECTIVES

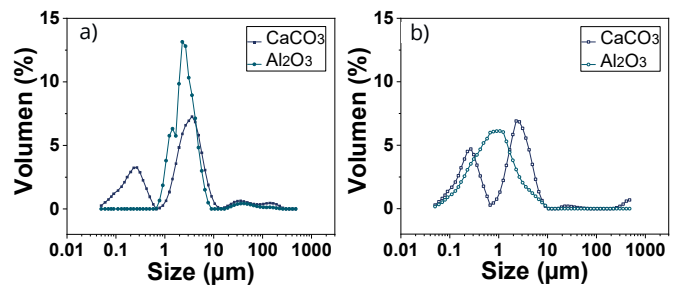
- Melt compounding (polymer + particles) to produce spinning raw material
- Bicomponent fiber manufacturing under different processing conditions with varying fiber parameters



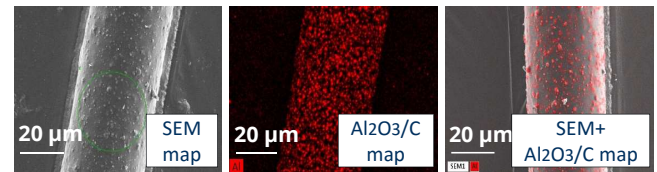
- Characterizing of polymer and particle raw materials
- Mechanical and structural characterization of produced fiber depending on the spinning conditions
- Analysis of the failure behavior by single fibre pull-out test
- Macromechanical dynamic composite testing

3 RESULTS

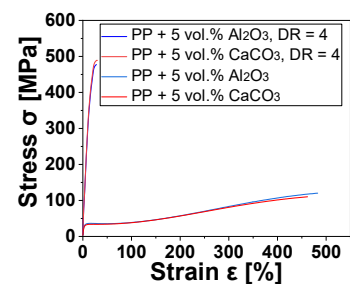
- Particles size distribution of the Al₂O₃ and CaCO₃ powder samples a) before and b) after ultrasonic bath



- Particle distribution analysis along the bicomponent fiber surface of PP + 5 vol.% Al₂O₃

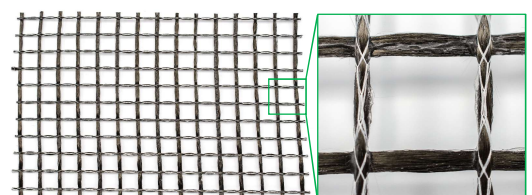


- Tensile properties determined on different fiber compositions before and after offline drawing



4 PLANNED COLLABORATIONS

- T. UTECH (assoc. to A2/II): fiber modification
- H. LE XUAN (A1/II): textile reinforcement



- M. BEIGH (A3/II): sustainability and impact resistance of SHCC with PP fibers
- H. KNOBLOCH (B1/II) and J. Stöcker (B3/II): numerical modelling at the micro and mesolevel