Working at the University in the field of Additive Manufacturing

Dr.-Ing. Anke Kaletsch

SAM Webinar “Young Experts and Managers in AM”, 27.04.2021

Anke Kaletsch - professional development

Since June 2015

- **Head of Division Powder Technology** at the Institute for Materials Applications in Mechanical Engineering (IWM), RWTH Aachen University

Since December 2014

- **Deputy Head** of the Institute for Applied Powder Metallurgy and Ceramics (IAPK) e.V.

2010 –2015

- **Dr.-Ing., Mechanical Engineering,** RWTH Aachen University
  - → Doctoral Thesis: “Reactive Air Brazing of Ceramic-Metal-Joints and their Aging Behavior in Oxidizing Atmosphere”

2005 –2010

- **Dipl.-Ing., Mechanical Engineering,** FH Aachen University of Applied Sciences
  - → Diploma Thesis: „Joining Alumina with Glass solders – Characterization and Optimization“

Anke Kaletsch – current job position

Head of Division Powder Technology (IWM) and Deputy Head of Institute (IAPK)

- Scientific supervision and management of 10 scientific staff members in three working groups:
  - → Process Technology
  - → Process Simulation
  - → Hardmetal and Cermets
- Attracting third-party funding
- Controlling of projects and orders within the division Powder Technology and at IAPK
- Strategic development and promotion of the division Powder Technology and the IAPK
  - → Research strategy
  - → Buildup of networks
- Working on my habilitation treatise in the field of my own main research: The Combination of Additive Manufacturing (AM) and Hot Isostatic Pressing (HIP)
  - → Habilitation = postdoctoral lecture qualification

Working at the University

- **Scientific qualification (Ph.D., Habilitation)**
- **Research**
  - → Working on research projects with partners from universities and industry
  - → Publishing of results in journals
  - → Presenting results at conferences
  - → Working together with students and supervise student assistants and bachelor-/master theses
- **Applying for funding**
  - → Developing new ideas and topics
  - → Discussing research topics with other researchers and industry
  - → Presenting research ideas and topics
  - → Writing research proposals

Working at the University

- **Working on industry projects (R&D or services)**
  - → Writing Proposals/Quotations
  - → Discussing topics with industry
  - → Giving updates of the results to the project partners at regular intervals
  - → Writing reports
- **Academic teaching**
  - → Lectures
  - → Seminars
  - → Practical training

Working at the University means:

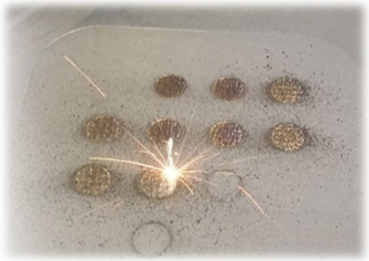
- Further scientific qualification
- Varied duties and responsibilities
- Learning every day something new
- A lot of reading and writing
- It will never be boring

Research topics in the field of additive manufacturing

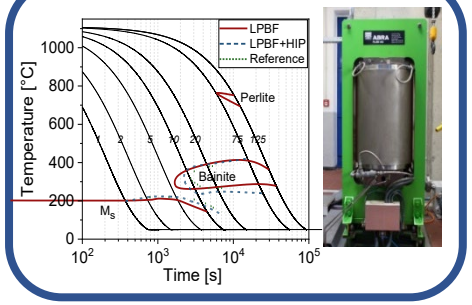
The Laser Powder Bed Fusion (LPBF) process chain

Powder processing

Sample build-up

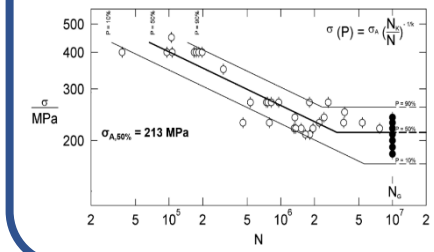


Post treatment



Microstructure

Mechanical properties



Material ⟷ **Process** → **Microstructure** → **Properties**

Materials development

Motivation for materials development

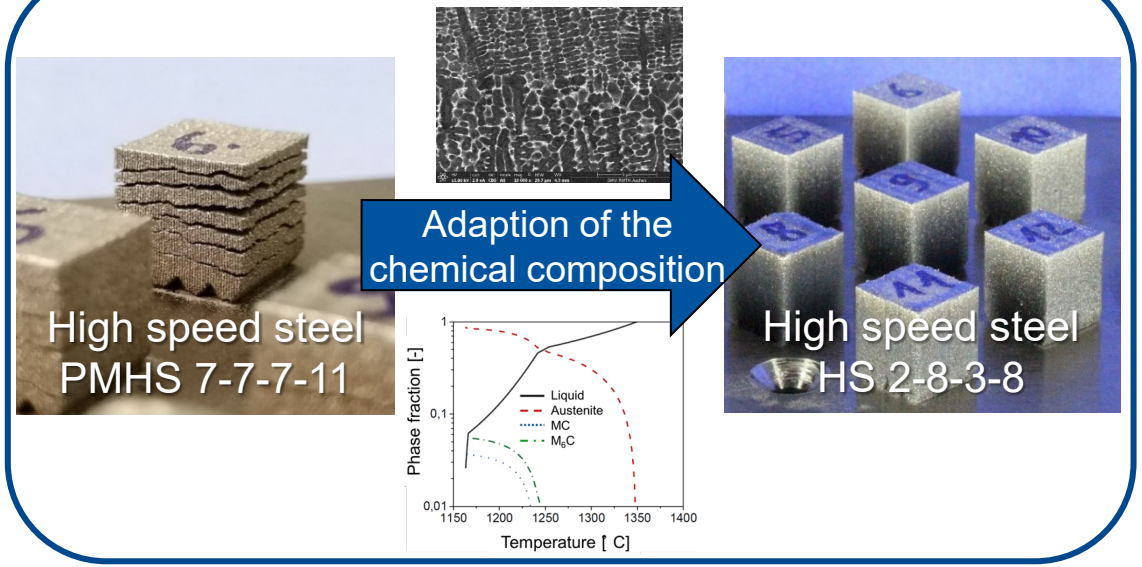
- To improve the processability

  → Hard materials that are difficult to manufacture

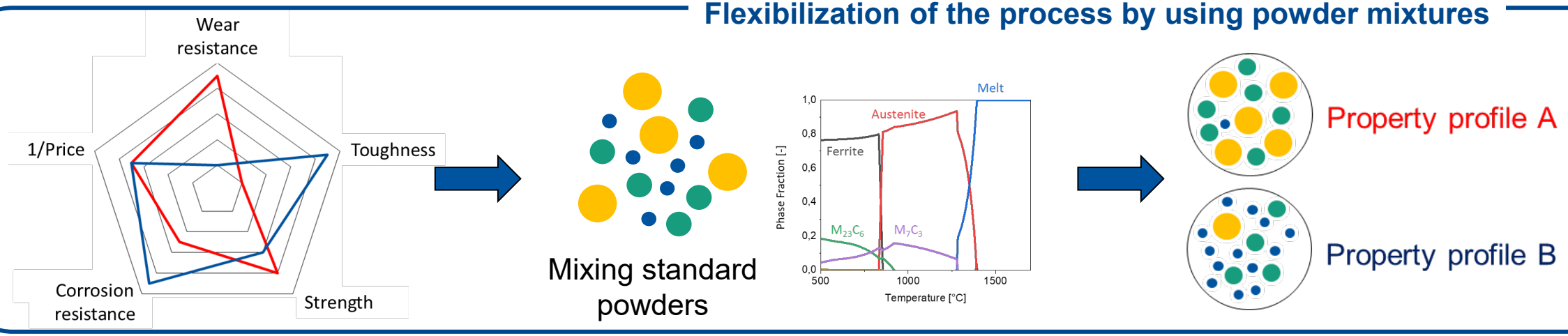
- To increase the material flexibility

  → In-situ alloying by using powder mixtures to achieve a desired microstructure/ properties

Materials that are difficult to manufacture



Flexibilization of the process by using powder mixtures

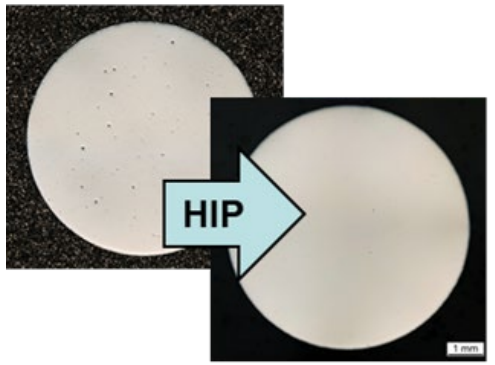


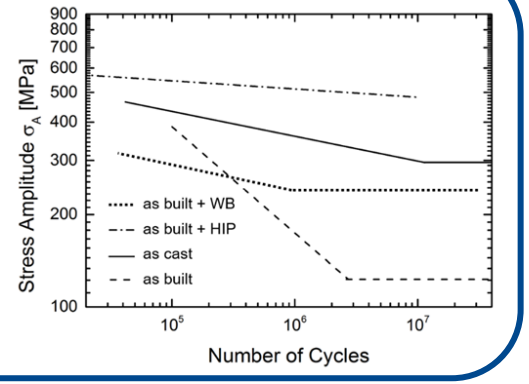
Process development

Motivation for the process combination of LPBF and HIP

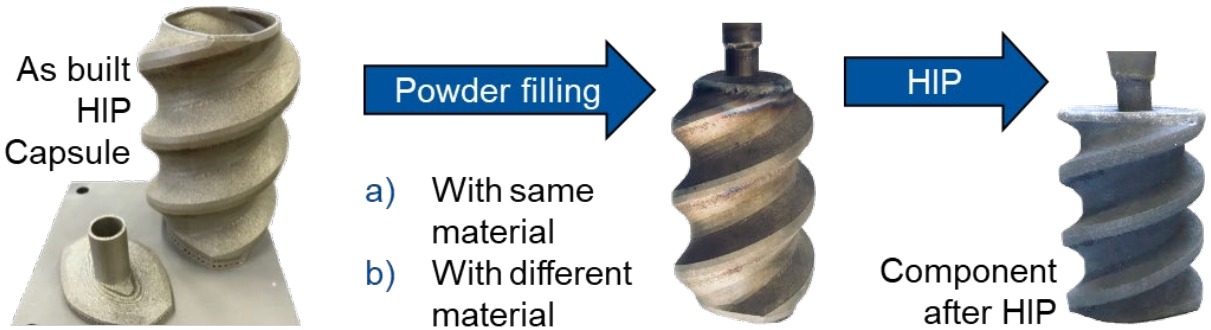
- For the improvement of the mechanical properties
- To accelerate the LPBF process
- For the production of large and complex net-shape-components and functional composite-components

Improvement of the mechanical properties

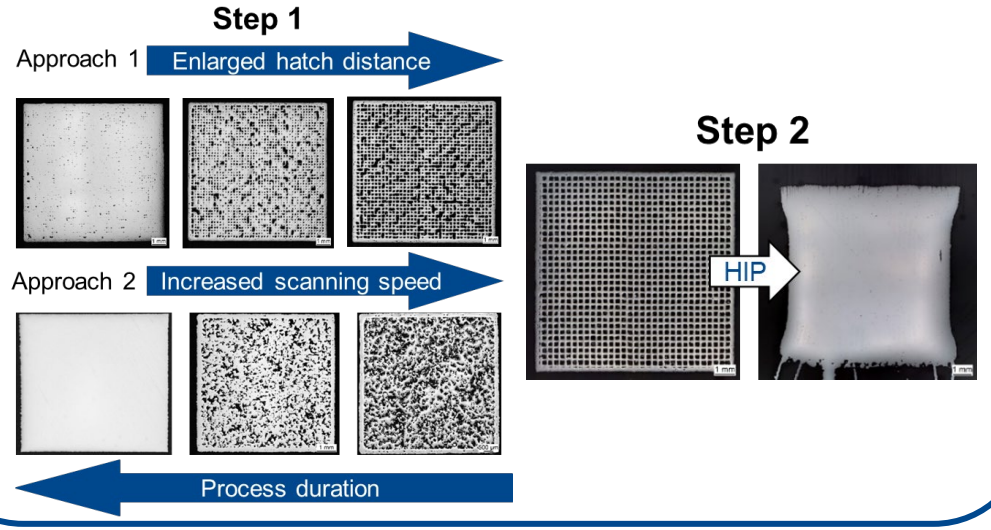




Production of large and complex net shape components and functional composite components



Acceleration of the LPBF-process



Thank you very much for your kind attention.

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