Smart Gas Atomization
How big data can facilitate smart & sustainable atomization

smart

advanced manufacturing

ORGANISATION PROFILE

Insert brief description of the leading organisation: Name, Personnel, Size, Products/Services/Technical areas and R&D project expertise.

Swerim AB
190 employees, 280 MSEK turnover

The metals research institute Swerim conducts needs-based industrial research and development concerning metals and their route from raw material to finished product. Our vision is a fossil-free and circular industry. This includes manufacturing of powder materials where Swerim has competence and equipment along the whole value chain. A modern pilot scale metal powder gas atomizer is central in this proposal. Swerim also has long experience with relevant competences within the field of digitalization and measurement techniques.

PROPOSAL INTRODUCTION (I)

Vision
Smart usage of sensors and instrumentation to lower the environmental impact of gas atomization by monitoring and understanding the process to fullest extent.

Motivation:
Gas atomization is the most common production method for producing metal powders. Metal powder is used for various applications that all have different requirements on the powder with respect to particle size, powder properties, and quality. With industrialization of additive manufacturing the demand on certain particle sizes has increased and is expected to continue increasing. When producing metal powder with gas atomization a wide particle size distribution is produced that must be separated to the sizes of interests and the unwanted powder is scrapped. By increasing the process understanding and control, and implementing a direct feedback loop, the production yield of the desired powder can be increased. The process is complex and the knowledge on how different parameters affects the end product, metal powder, is limited. Some of the parameters can be measured today, but many are still unknown.

Content:
- Application of suitable methods to measure critical process parameters and resulting particle size distribution in gas atomization in-line in pilot and industrial scale
- Develop predictive model for powder properties based on process/sensor data using machine learning
- Proposal of system design for feed-back looping during atomization

PROPOSAL INTRODUCTION (II)

Expected outcome:
New possibilities for process monitoring and in- and offline usage of process data. The results will be used to obtain a higher understanding of how different process parameters effects the final product with focus on particle size distribution, powder properties, and quality. Furthermore, the results will also give the powder producers the possibility to speed up the digitalization of their gas atomization process to get direct feedback. This enables instant adaption of the production process to increase the probability of having a successful atomization run and meet the requirements from the final application of the powder.

Impacts:
The project will increase process robustness and probability for increased production yield in regard to powder quality, i.e., particle size and morphology, bulk powder properties, and chemical composition. By fewer failed production charges and by increasing the yield in the successful ones, less waste are produced and hence more effective use of the earth's resources giving a smaller environmental impact. At the same time, this will increase the competitiveness of the powder producing companies. In the longer run, a more efficient powder production and better control of the powder quality will be beneficial for the powder users, e.g. in additive manufacturing, which will make the market grow faster.

Schedule: *To be decided but most probably 3 years*

PARTNERS

Current

From Sweden, Swerim, KTH Royal Institute of Technology, and powder producers are involved in the discussions.

Partner search:
Research and/or industrial partners offering analytical process monitoring solutions or big data handling are searched for. More specific, a partner with expertise on acoustic monitoring would strengthen the consortium. New partners can be from any other country than Sweden.

CONTACT INFO

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