MIM meeting

Chairmen:
Prof Dr.-Ing. Frank Petzoldt (Fraunhofer IFAM, Germany)
Dr Bruno Vicenzi (Clayver srl, Italy)

Sunday 9th October 16:30 – 18:30
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<thead>
<tr>
<th>Time</th>
<th>Session</th>
<th>Speaker / Details</th>
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<tr>
<td>16.30-16.35</td>
<td>Welcome and Introduction by Chairmen</td>
<td>(Prof Dr.-Ing. Frank Petzoldt / Dr Bruno Vicenzi)</td>
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<td>16.35-16.45</td>
<td>Trends Survey feedback</td>
<td>(Dr Bruno Vicenzi, Clayver srl)</td>
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<td>16.45-17.00</td>
<td>Market Overview</td>
<td>(Keith Murray, Sandvik Osprey Ltd.)</td>
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<td>16.55-17.45</td>
<td>Panel Discussion : End Users Case Study : What is the potential of MIM for end users business ?</td>
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<td>17.55-18.05</td>
<td>Club Project proposal</td>
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<td>18.05-18.15</td>
<td>MIM Seminar 2017</td>
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<td>18.25-18.30</td>
<td>Conclusion by Chairmen</td>
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EuroMIM Trends Survey 2016

Included
• 12 manufacturers
• 10 powder/feedstock/equipment
• 2 others (University/consultants)

General assessment of the business: good but not as good as in the best years

Expectations for next year: positive
Trend Survey Feedback short outlook

MIM sales trend for 2015

- 65% up (2015: 50%)
- 20% stable (2015: 40%)

MIM sales trend 2016

- 79% (56% in 2015) vote increase
- Only 5% decrease (slight)

About 60% will be adding capacity (Highest value since 2011)

Main problems that slow down the widest acceptance of MIM?

- Awareness of MIM
- Price competition (other tech, low-cost countries)

Sectors offering the best medium term prospects for MIM?

- Medical and automotive always preferred
- Automotive and consumer up
Market Overview

- Keith Murray
Panel Discussion – End Users Case Study
What is the potential of MIM for end users business?

• Moderator
  – Prof Dr.-Ing. Frank Petzoldt (Fraunhofer IFAM)

• Speakers
  – Dipl.-Ing. Katharina Horke (Rolls-Royce) for aerospace application
  – Marco Mulser (Fraunhofer IFAM)

• Panel
| Break | 10 mn |
Club Project Proposal

- Proposal were from Roadmap 2025
  - Zero defect program
  - Updating and developing new MIM standards
  - Developing new materials and powder grades
  - Advanced process to include more functionality into components
  - Tailored properties of MIM components
  - Simulation of the process chain

Would you be in favour of a MIM club project?

- 76%

Proposal from the group

Who is interested?
- ?
- ?
- ?
- ?

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<th>Answer Choices</th>
<th>Responses</th>
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<tbody>
<tr>
<td>Improving raw material quality and specification methods</td>
<td>17.65%</td>
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<tr>
<td>Developing new materials and powder grades</td>
<td>41.18%</td>
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<td>Simulation of the process chain</td>
<td>23.53%</td>
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<td>Widen the size range of commercially viable components (micro and macro)</td>
<td>5.88%</td>
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<td>Improvements in energy efficiency along the process, with a focus on sintering</td>
<td>5.88%</td>
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<tr>
<td>Advanced processes to include more functionality into components</td>
<td>29.41%</td>
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<tr>
<td>Tailored properties of MIM components</td>
<td>29.41%</td>
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<td>‘Zero defect’ programme</td>
<td>52.94%</td>
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<td>Ensuring the biocompatibility of materials as the medical market is of significant importance for the MIM industry</td>
<td>17.65%</td>
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<td>Process improvement and further understanding of the debinding furnace</td>
<td>17.65%</td>
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<tr>
<td>Updating and developing new MIM standards</td>
<td>41.18%</td>
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Total Respondents: 17
Impact of gas flow on delubrication and reduction during heat treatment of PM components

The consumption of process gas during the heat treatment of PM components causes significant costs, in particular when reducing atmospheres are used. However, only little is known on the impact of gas flow rates on the delubrication mechanisms and the loadability of the atmospheres with decomposition products. The same holds for the impact on the reduction of surface oxides, which is essential for a proper sintering result. Thus, the parameterizing of such processes typically is done empirically and, to be on the safe side, gas flow rates are adjusted too high.

The aim of the present project is the identification and quantification of the impact of the gas flow rate on the process parameters needed to produce high quality PM components. In this context, the main questions to be answered are:

- What is the maximum loadability of typical process atmospheres with decomposition products of the delubrication/debinding?
- How do low gas flow rates affect the required parameterization of the heat treatment?
- How does the gas flow rate and the loading of the process atmosphere with decomposition products affect the decomposition dynamic (e.g. needed delubrication times)?
- How does the gas flow rate of reducing atmospheres affect the reduction of surface oxides?

Therefore, typical PM steel with typical lubrication agents (for example Astaloy CrM + Kenolube) will be heat treated with various gas flow rates. In the first step, the process determining gases will be determined by measuring the gas composition at constant heating rates. In doing so, the maximum decomposition rates and optimum reduction temperatures will be figured out. In the second step, the concentration decrease of the process-determining gases at fixed temperatures and various gas flow rates will be evaluated.

At Fraunhofer IFAM Dresden Technologies have been developed which allow to determine the actual chemical composition of the process gas within the furnace. The method gives precise information on thermochemical processes and their temperature dependency. Thus, debinding mechanisms as well as reduction or decarburizing reactions can be evaluated under realistic conditions, enabling effective design or optimization of heat treatment processes. The method also has been used to measure the chemical composition of process gases within the delubrication zone of belt sintering furnace.

MIM Seminar 2017: Are you in favour of a MIM seminar in 2017?

- Oriented from MIM community to end users / “collaborative” meeting

- Answered: 21, Skipped: 3
  - 81%

1 seminar with 4 topics
  - Automotive
  - Medical
  - Aerospace
  - Electronics

- When: April
- Committee
  - MIM Steering committee + end users willing to join
Conclusion by Chairmen

- Click to add text