Contribution ID: **144** Type: **2. Invited speaker (by invitation only)**

Printed Power: High-Performance Electrical Steels via Powder Metallurgy

Electrical steel sheets are conventionally produced by rolling followed by punching. With the ongoing electrification there is a growing demand for thinner laminations. However, further thickness reduction by conventional manufacturing is challenging. Moreover, alloy design is limited to compositions with sufficient ductility for mechanical processing.
Additive screen printing represents an alternative manufacturing route for next-generation electrical steels, enabling near-net-shape fabrication of thin sheets with tailored compositions independent of ductility. The sinter-based screen-printing process allows the production of ultra-thin laminations with minimal material waste and precise control over sheet thickness and composition. Reducing the sheet thickness below 200 µm and increasing the silicon content up to Fe-6.5Si significantly lowers eddy-current losses. Recent developments extend the approach to high-performance Fe-Co alloys, revealing distinct sintering behavior depending on powder characteristics and phase evolution. Furthermore, multimaterial screen printing of metal-ceramic composites enables the fabrication of electrically insulated steel stacks. The influence of powder type and alloy composition on densification, shrinkage behavior, and the resulting magnetic and electrical properties is discussed, providing a materials-based pathway toward thin Fe-Co laminations with reduced high-frequency losses and limited post-processing.

Professional Status of the Speaker

Senior Scientist

Interest in submitting a paper in a special issue of

Advanced Engineering Materials (Wiley)

Invitation letter for visa

No

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Session Classification: Sintering for additive manufacturing

Track Classification: Group 4: Sintering for additive manufacturing