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# How the Chemical Vapor Infiltration process can be optimized for the production of advanced composite and porous ceramics

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Chemical Vapor Infiltration (CVI) is a high-quality and versatile process enabling the preparation of reinforced porous and architecture ceramics as well as Ceramic Matrix Composites (CMC), which are high-temperature materials for aerospace, energy management and industrial systems. Very strong market growth perspectives trigger renewed interest in this process. However, being expensive and/or somewhat difficult to control and optimize, it needs modelling actions at least to provide guidelines for industrial usage.

This presentation will describe the process physico-chemistry and its modelling, which has to be multi-physics and multi-scale. The numerical tools range from simple analytical approximate formulae to detailed, image-based modelling of heat & mass transfer coupled to chemical reactions and featuring porous media with morphological evolution. Special attention is paid to (i) the relationship between fibrous media structure and transport properties, including rarefied gas transfer mode, (ii) the potential of using thermal gradients in order to optimise CVI and obtain a fast and efficient infiltration.

## Participation

In-Person

## References

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## Energy Transition Focused Abstracts

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