

Novel approaches to densify powder metallurgical materials through hot isostatic pressing

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Powder metallurgical materials usage in high performance applications is limited by the inherent porosity that contributes to the inferior properties as compared to the wrought material. Combination of powder metallurgical routes with HIP as a final processing step allows to reach fully dense material. In addition, recent development in HIP processes with integration of rapid cooling proved to be an effective in diminishing the processing time and cost. The objective of this work is to reach closed porosity through different powder metallurgy routes that can be further HIP:ed without using capsules. Powder metallurgy consolidation methods considered ensure surface densification either through one of the following approaches such as liquid phase sintering, double pressing and double sintering or cold isostatic pressing combined with high temperature sintering. All mentioned above methods bring cost-competitiveness as components can be densified without any capsules that will improve the process timing and cost. All of these methods are based on utilisation of the water atomised powder that also bring additional cost competitiveness.

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Materials

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