Ultra Complex MIM Parts in Automotive Application

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Abstract

The innovative shape giving capabilities and sintering techniques applicable to PIM that goes beyond mouldable shapes. Special techniques for manufacturing of PIM parts of extreme complicity and precision performance are also described. In the automotive industry the design of high performance components are moving to include multiple functions in one product. These strategic applications demand extreme capabilities from the PIM processing techniques. The components must satisfy highest level of reliability and manufacturing consistencies. Moulding of ultra complex designs, reliable assembly techniques for moulded multi-components and controlled depolymerising of the assemblies followed by controlled diffusion sintering of the parts for structurally superior component. Powder particle size and strength of binder management and design, assembly tolerances, diffusion sintering and shrinkage management are important factors discussed. The innovative PIM technological capabilities are considered the key towards rapid advancement into new markets and applications

Mechanism of Delubing during Sintering of Ferrous Compacts

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Abstract

Delubing of green PM compact during the first stage of the sintering process is critical in that it affects the quality of the end product. Optimization and control of delubing during sintering requires an understanding of mechanisms of the physical and chemical processes involved in binder removal/pyrolysis. Organic species produced during binder pyrolysis and emitted within the 350 to 700 temperatures range were analyzed and monitored using DUV, IR and mass spectrometry. Observed time dependencies were compared with mass loss measured using TGA (thermo gravimetric analyses) within the same temperature range. The results will be discussed and the mechanism of binder removal/decomposition will be presented.