A comparative study of metal and ceramic injection moulding for precision applications

Powder injection moulding (PIM) process is an attractive process as it combines the possibilities of net-shape and large-scale production with wide range of material varieties. This article presents a comparative study of two branches of PIM processes with the focus on precision application. The two branches of PIM - metal injection moulding (MIM) and ceramic injection moulding (CIM) have been developed in parallel. Both processes are in a stage now where they can offer exciting possibilities for mass production of extremely precise and complex net shape products. For some applications, PIM process presents a dilemma for choosing between MIM and CIM as both the material classes can offer specific advantages and the process steps are identical. So a comparative study about the process capabilities between CIM and MIM will be useful for thorough understanding of the processes and to select the right material and process for the right application. With this motivation, the current paper systematically characterizes the PIM and CIM process and presents the process capabilities in terms of part shrinkage, surface replication, tolerance capability and morphological fidelity.

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