

Powder Injection Molding for Multi-Scale Fabrication

Roshan Urval, Dr. Sundar V. Atre Seong Jin Park
Oregon State University
Corvallis, OR

Powder injection molding (PIM) shows a lot of promise to economically fulfill the complex demands of fabricating typical multiscale components. With the rapid advancements in multiscale applications, the next logical direction would be looking into the commercialization of these applications. As most researchers involved in the field of multiscale technology would agree, the key to commercial feasibility, let alone success, lies in economical mass-production. Some of the current multiscale fabrication techniques maybe found lacking in one or more aspects, including mass-producing ability, production time and cost, material options, dimensional tolerances, etc. For commercialization, solutions need to be found for these issues. PIM could be that solution. It is a net fabrication technique that combines the complex shape-forming ability of plastic injection molding, the precision of die-casting, and the material selection flexibility of powder metallurgy. Using a state-of-the-art design tool, PIMSolver[®], we are investigating PIM for fabrication of multiscale components. The process design issues related to molding thin parts with high aspect ratios, and embedded micro-scale features typical of multi-scale components will be discussed.