

A Study of Solvent Debinding Variables on Ti6Al4V Green Bodies

Abstract

Debinding is one of the most critical and time consuming stage in metal injection moulding (MIM). German and Bose (1997) reported that early debinding practice relied on thermal binder degradation, requiring up to 300 hours for complete binder removal. Today multi-stage debinding techniques are introduced cutting down the debinding time to as little as 2 hours. This work investigates solvent debinding variables prior to thermal debinding. Solvent debinding is carried out in *n*-heptane. Wax and stearic acid are the target binder components being leached out from the green bodies, with wax as the major constituent in the binder formulation. Debinding is conducted at 50, 55, 60 and 65°C for 1-4 hours at each temperature. Weight loss measurements were done. For porosity and surface appearance, scanning electron microscope (SEM) analysis and visual inspection were done. Samples de-bound at 65°C showed an appreciable amount of mass loss; however, surface cracks and warping were observed. A 60°C temperature and time of 4 hours demonstrated best results i.e. a satisfactory mass loss, absence of surface cracks and no warping. Mass loss is directly proportional to temperature and time. SEM results are discussed in the paper.