

Optimization of injection molding parameter of ti-6al-4v powder mix with palm stearin and polyethylene for the highest green strength by using taguchi method

Abstract:

This paper present the Taguchi method of L27 (313) orthogonal array as a tool in optimization of Metal injection molding (MIM) parameters for the highest green strength. Injection pressure, injection temperature, powder loading, mold temperature, holding pressure and injection speed are Parameters to be optimized. Besides those, interaction of the injection pressure, injection temperature and powder loading were studied. The metal powder of Ti-6Al-4V is mixed with binder 60wt% of palm stearin and 40wt% of polyethylene successfully injected at optimum parameter condition: 350 bar of injection pressure, 140oc of injection temperature, 65vol% of powder loading, 50oc of mold temperature, 600 bar of holding pressure, and 10ccm/s of the injection rate. Analysis of variance (ANOVA) for the best signal to noise ratio (S/N) presents the contribution of the parameters to the quality characteristic (green strength). Results show that the mold temperature has highest significant percentage (27.59%) followed by powder loading (15.44%) and injection pressure (12.30%) Nevertheless, the analysis of variance does not show any contribution from interaction.