

ABSTRACT

The most recent development in microwave applications is in sintering of metal powders, a surprising application, in view of the fact that bulk metals reflect microwaves. In this study, tin base alloy is sintered in a modified domestic microwave oven. The Taguchi Parametric Robust Design, based on orthogonal array (L_8) has been used to plan the experimental conditions, with three replications. The control parameters chosen are sintering temperature, compaction pressure, type of sintering and sintering time. The effect of the control parameters on dimensional change, density, porosity, hardness, and microstructure is studied. Signal-to-noise ratio (S/N) is analyzed through Pareto Analysis of Variance (ANOVA) and iso-level values to arrive at the optimum combination of input parameters for tin base alloys. The conventionally sintered properties and the microwave sintered properties of the specimens are also compared.

It has been concluded that for high overall density, high sintering temperature, high compaction pressure and sintered in a microwave furnace for shorter period of time is required, while for high open porosity, high sintering temperature, low compaction pressure and sintered in a microwave furnace for shorter time period is required. To have high hardness properties, high sintering temperature, low compaction pressure and conventional sintering for larger period minutes is required.