Effect of Ceramic Dispersion on Sintering Characteristics of 2xxx Series Al Blended Powders

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Aluminum alloys possess several advantages such as good machinabilty, high thermal and electrical conductivity, low density (≈ 2.7g/cm^3) and high specific strength. Generally, aluminum alloys were fabricated by casting or forging process, however it has some disadvantages such as casting cavity, difficulty to produce complex parts, high production cost for finishing process. On the other sides, P/M process has cost-effective in producing and is possible to make products of complex shape because near-net shape forming is possible. Recently, the application of Aluminum alloys was increased and the products were used in tremendous environment. So, metal matrix composites have received amounts of attention due to their enhanced mechanical properties. In this work, the sintering characteristics of Al Metal matrix composites would be studied by compared to commercial Aluminum alloy powder.

Commercial Aluminum alloy powder (Al-3.8Cu-0.75Si-1.0Mg-1.5AcrawaxC wt.%) and Aluminum metal matrix composites (as added 5wt.%-Al_2O_3) were used starting powder. The powders were uniaxially pressed with optimum pressure and Acrawax was eliminated at 400℃ for 30min. They are sintered at 620℃ for 30min in dry N_2 atmospheres with heating rate of 25℃/min. It was revealed that the relative density of the sintered part with Aluminum alloy powder was about 92% and that of Aluminum metal matrix composites was about 95%. The sintering behavior was investigated with the observation of the microstructures at the intermediate stage ranges from 400℃ to 620□. The sintering behavior was also studied by differential scanning calorimetry (DSC).