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Topic of Research: Surface Density Modification Using Hybrid FSP

FINDING

In the current study, AA6061-T6 aluminum foam was effectively generated using the single pass FSP approach with MgCO3 as the foaming agent. Then FSPed sample heated into electric furnace (Muffle Furnace) to produce aluminum foam on AA6061-T6. The effect of the major FSP runs, tool rotational speed, transverse speed, foaming time and foaming temperature on the density change, pore size and porosity has been investigated and it was essential to a project's success.

It was possible to effectively construct the AA6061-T6 metal foam in a variety of densities ranging from 1.625 to 2.445 g/cm^3. And percentage change in porosity ranging from 4.53% to 45%. We noticed the influence that different FSP parameters had on the density and shape of the aluminum metal foam, and as a result, we investigated the physical properties of the foam that we created. In the current round of testing, the FSP parameters were fine-tuned with the use of the fractional factorial design in order to achieve a porosity level up to 200%. It has been thoroughly investigated how factors such as relative density, grain size and porosity influence the mechanical properties of the metal foam that is created by following this method. It was discovered that the suggested method of forming metal foam utilizing FSP as the beginning process was effective in creating metal foam of a high grade. When compared to the value reached in the case of metal foams generated in a commercial setting. In addition, the statistical methods that were utilized in this investigation may be of assistance to the scientists and researchers who are designing, developing, and further improving the techniques of foaming in order to get a control of all of the significant mechanical and physical properties of this category of foams.

Keywords: **Keywords:** Friction Stir Processing, Metal Foam, AA6061-T6, $MgCO_3$, Grain Size, Porosity, Density, Shoulder Diameter, Tool Rotation Speed, Tool Transverse Speed.