

DENSITY-GRADED ALUMINUM FOAMS BY THE CORROSION METHOD

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In the usual foaming methods, variations in pore fraction, size, or architecture within a foam product are generally avoided and considered undesirable. However, for example lightweight structures, momentum transfer devices, fluid filters, or thermal insulation, controlled density gradients would allow optimization of foam properties to best meet specific application requirements. In this study, novel processing methods were discussed for controllable density grading in open-cell 6101 aluminum alloy foam. Both the linear density change and the microstructure change of the struts surface of graded foams by corrosion were also presented and discussed as compared with conventional uniform foams.

In order to change continuously the density of 6101 aluminum alloy foams (initial pore size of 20 PPI) which performed T6 or solution treatment, the artificial corrosion by controlled pH and temperature of base were examined. The NaOH aqueous solution at room temperature of pH13 showed the faster corrosion rate to foams, and it was found out that it was effective for grading of 6101 foam. In addition, grading of the density was possible by using the simple apparatus for controlling dripping velocity. The struts size of the graded aluminum foam fabricated by this corrosion method was thin and uniform. Also, the surface state of the struts which will have considerable effect on various mechanical properties was smooth, and metallic luster was maintained.

Oral presentation : no

Poster presentation yes