

Development of Al Foam by a Low-Cost Salt Replication Method for Industrial Applications

Authors : B. Soni, S. Biswas

Abstract : Metal foams of Al find diverse applications in several industrial sectors such as in automotive and sports equipment industry as impact, acoustic and vibration absorbers, the aerospace industry as structural components in turbines and spatial cones, in the naval industry as low frequency vibration absorbers, and in construction industry as sound barriers inside tunnels, as fire proof materials and structure protection systems against explosions and even in heat exchangers, orthopedic components, and decorative items. Here, we report on the development of Al foams by a low cost and convenient technique of salt replication method with efficient control over size, geometry and distribution of the pores. Sodium bicarbonate was used as the foaming agent to form the porous refractory salt pattern. The mixed refractory salt slurry was microwave dried followed by sintering for selected time periods. Molten Al was infiltrated into the salt pattern in an inert atmosphere at a pressure of 2 bars. The final products were obtained by leaching out the refractory salt pattern. Mechanical properties of the derived samples were studied with a universal testing machine. The results were analyzed in correlation with their microstructural features evaluated with a scanning electron microscope (SEM).

Keywords : metal foam, Al, salt replication method, mechanical properties, SEM

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