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# An Investigation on Energy Absorption Capacity of a Composite Metal Foam Developed from Aluminum by Reinforcing with Cermet Hollow Spheres

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**Abstract :** Lightweight and strong aluminum foam is developed by reinforcing Al-Si-Cu alloy (LM24) with Cermet Hollow Spheres (CHS) as porous creating agents. The foam samples were prepared by mixing the CHS in molten LM24 at 750°C, using gravity and stir casting. The CHSs were fabricated using a blend of silicon carbide and stainless-steel powders using the powder metallurgy technique. It was found that CHS reinforcement greatly enhances the performance of the composite metal foam, making it suitable for high impact loading applications such as crash protection and shock absorption. This study examined the strength, density, energy absorption and possible applications of the new aluminum foam. The results revealed that the LM24 foam reinforced with the CHS has the highest energy absorption of about 88 MJ/m3 among all categories of foam samples tested. Its density was found to be 1.3 g/cm3, while the strength, densification strains and porosity were 420 MPa, 34% and 70%, respectively. Besides, the matrix and reinforcement's microstructure, chemical composition, X-ray diffraction, HRTEM and related micrographic analyses are performed for characterization and verifications.

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