

A356

()

(net shape)

(bulk)

()

()

g/cm^3

plateau area

:

[]
Maiti []

W*

[]

[]

[]

(bulk)

MATLAB

(net shape)

[]

A356

AlSi7

Banhart .

(primary powders)

Duarte

[]

μm

A356

Merck

μm

/
Si

(~ °C)

A356

(foaming agent)

%

MPa

°C

TiH₂

[]

()

MPa

ASTM

[]

/

Instron

mm/min

MATLAB

...

(bulk)

A356

g/cm^3

(plateau area)

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()

/ /

. []

g/cm³

g/cm³

plateau area

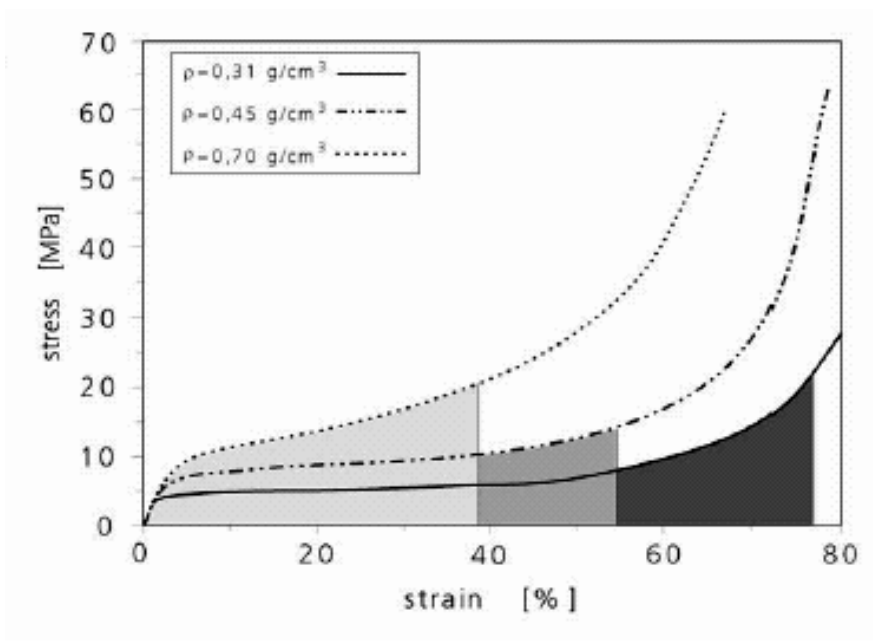
plateau area

EN C

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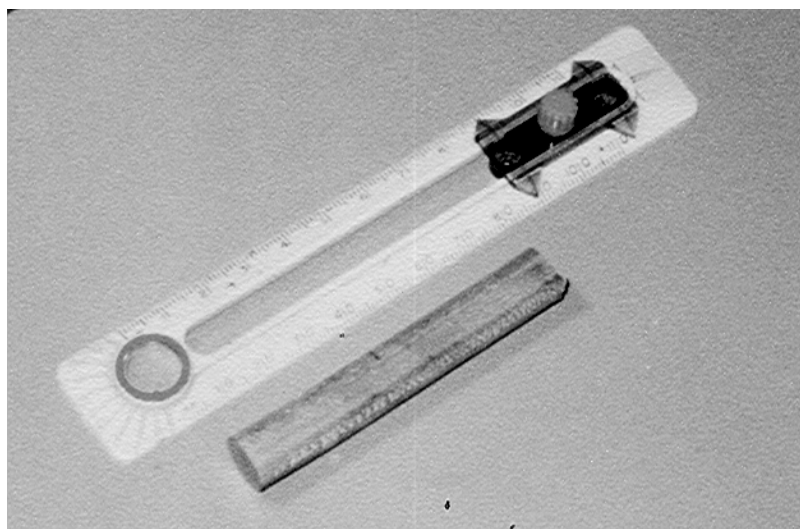
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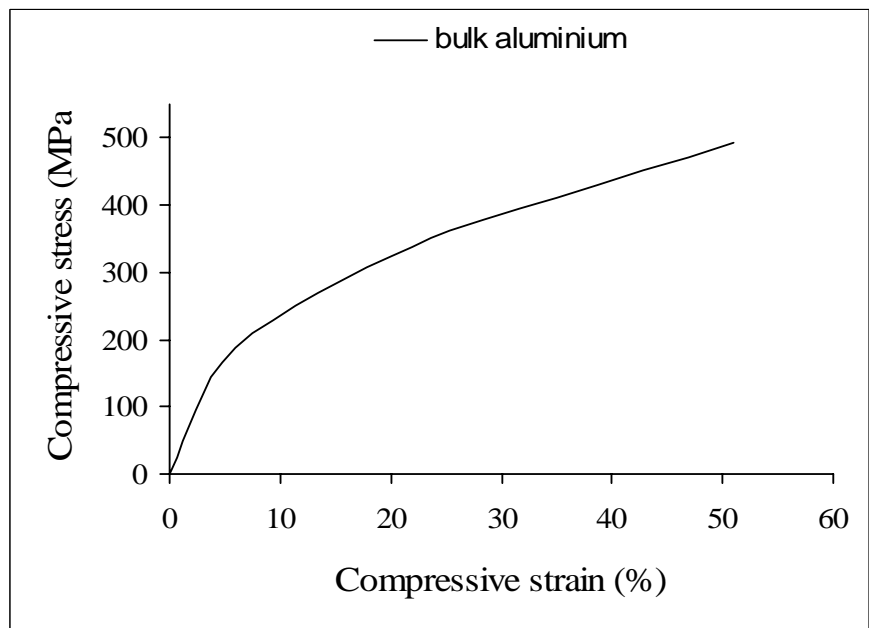
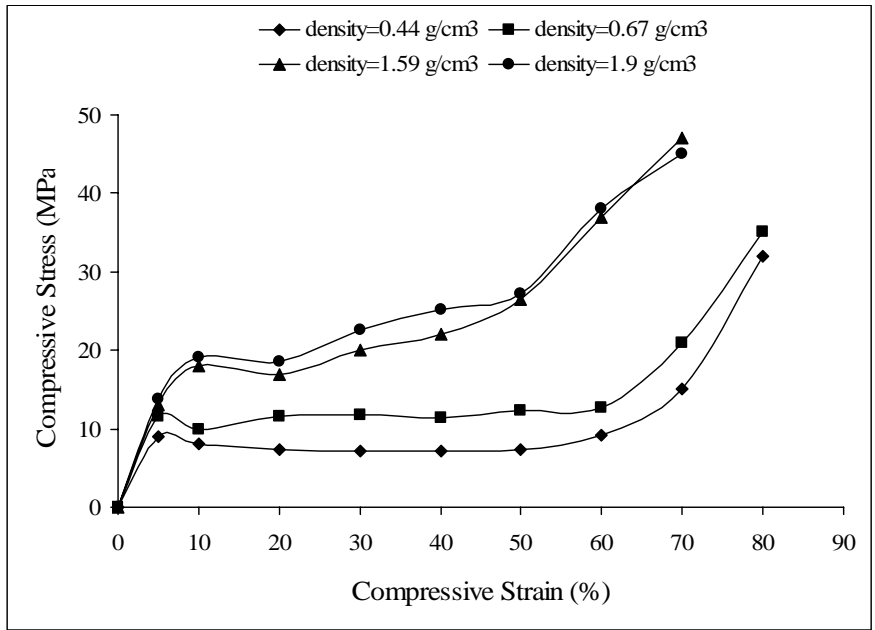


AlSi12

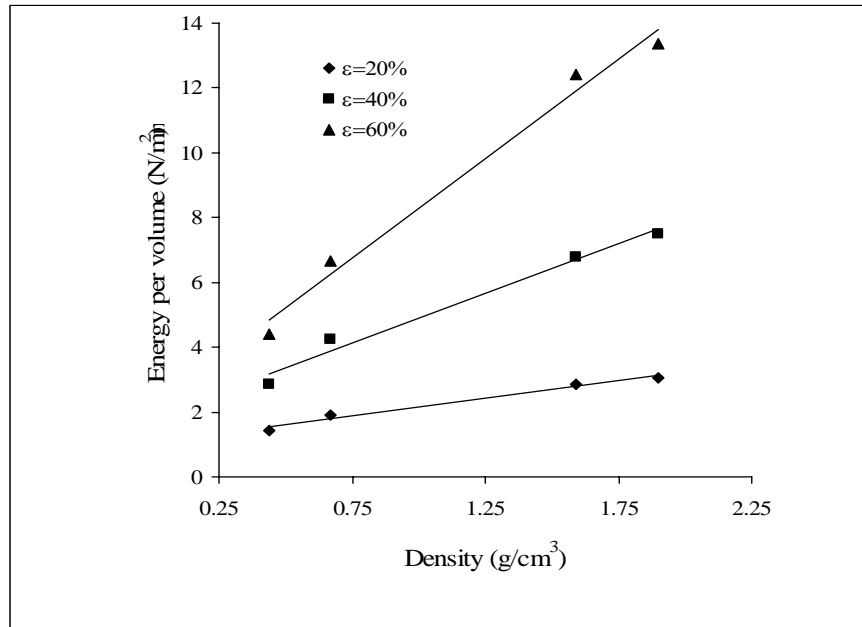
[] w*



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Investigation of the Compressive Properties of the Aluminium Foam (A356) Produced via Powder Process Route and their Dependence on the Foam Density

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Abstract

Nowadays, the tendency to use metallic foams made of aluminium or its alloys have been increased. One of the methods currently used to fabricate such foams is powder process route. The most important advantage of this technique is the ability to make net shape products. These constructions have high energy absorption capacity. They are usually very useful to be used as energy absorbers in cars to prevent of carrying crash impact into passengers. In the present study, aluminium foams of various densities produced via powder process route. Then by using of cylindrical samples with 25mm in length and 15mm in diameter, which their outer skin were not removed, the compression tests were done. The results showed that for the more dense samples; the closer behavior to bulk materials under compression would be expected. Also the amount of absorbed energy per volume unit of foam, which determined by the enclosed area by compressive stress-strain curve, was increased. Comparison of the latter curve with the foams compressive stress-strain diagram illustrated that absorbed energy per volume unit with increase in density of the samples can not be an appropriate criterion to design an energy absorber. It is important to note that the foams have a significant plateau regime in their compression test are the best choices for this kind of materials. In the present work this property was observed for foams with the densities less than 1g/cm^3 .

Keywords: Aluminium Foam, Titanium Hydride, Energy Absorption, Powder Process Route, Plateau Area