Global topology of yield surfaces of metallic foams in principal-stress space and principal-strain space studied by experiments and numerical simulations

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Highlights

- A new yield criterion of metallic foams under multi-axial quasi-static loading is proposed from the energy point of view, and yield points covering entire permissible principal stress/strain space are obtained.
- There is a discrete distribution of stress yield points in the global yield surface in principal-stress space.
- The yield lines are almost identical in the $(\varepsilon_{\mathrm{m}}, \varepsilon_{\mathrm{e}})$ plane, which means that it is better to characterize the global yield surface in principal-strain space than that in principal-stress space.
- The normalized strain yield surface of metallic foams is independent of relative density, and it can be characterized with a unified elliptic equation.