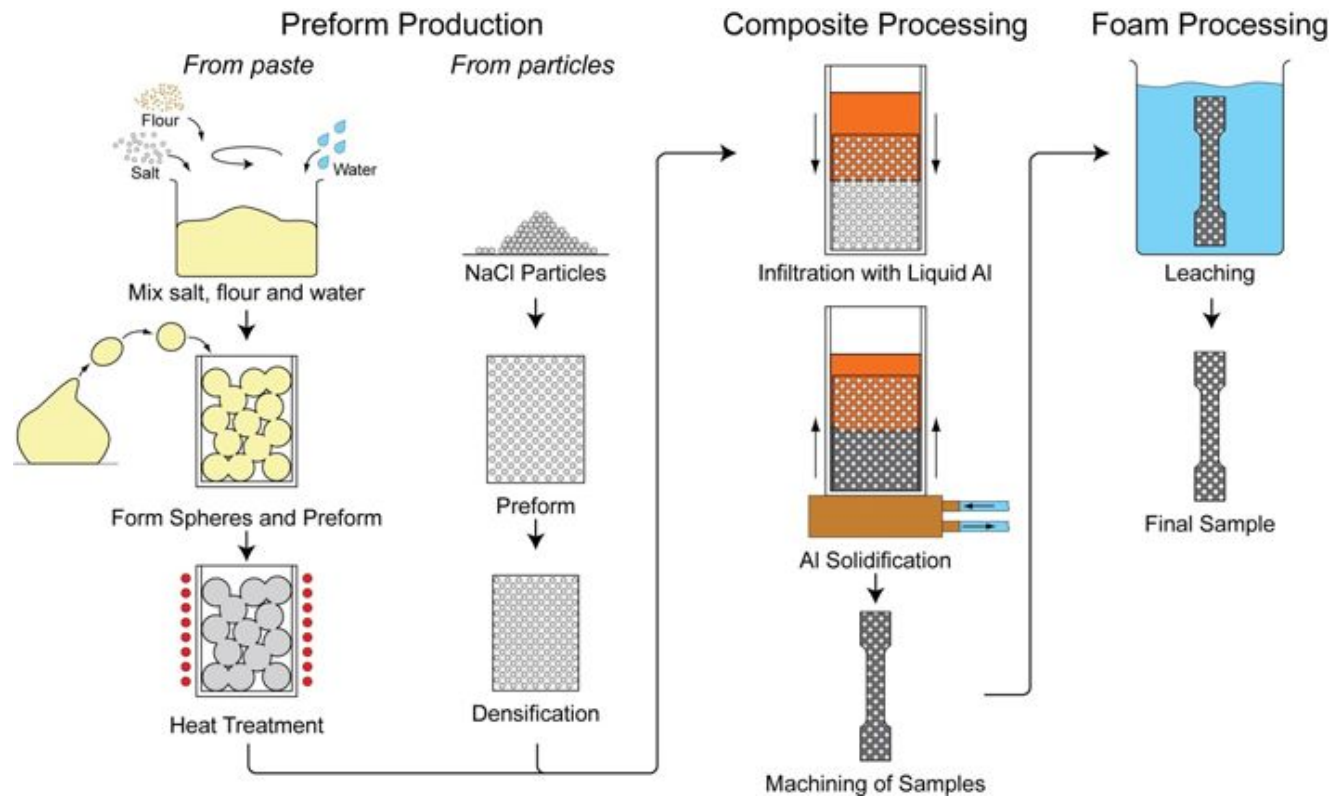


Porous Metals – *Sponges and Lattices*

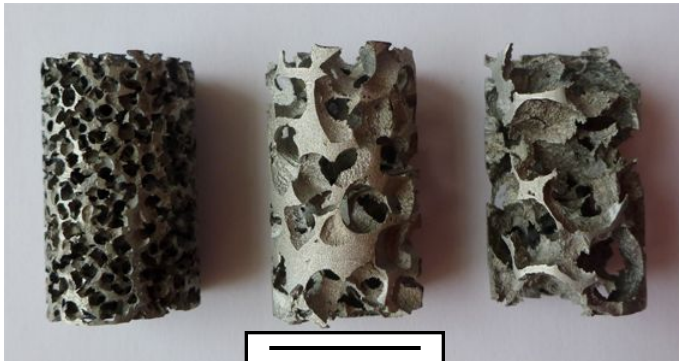
Dr Russell Goodall
Sponge Metals @ Sheffield – SM@Sh

Sponge Metals

- **Applications include:** Lightweight structures, impact resistance, heat transfer
- Made by a simple process - **Replication**

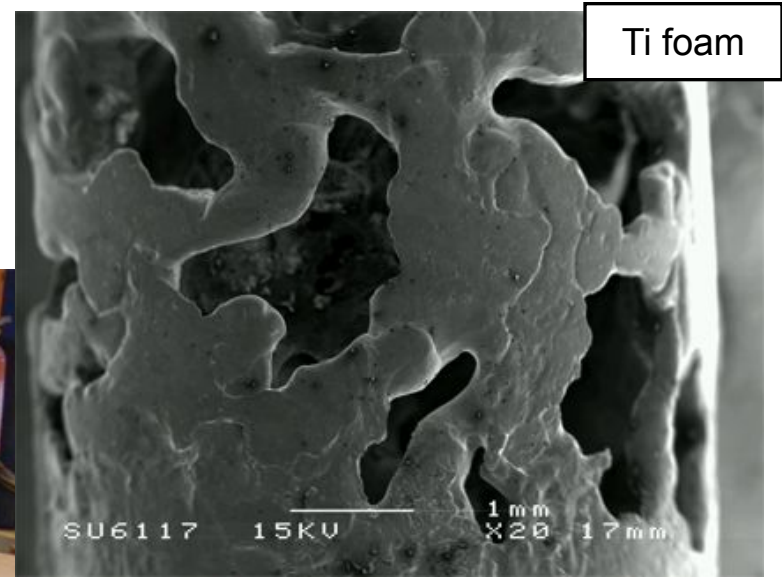


Sponge Metals

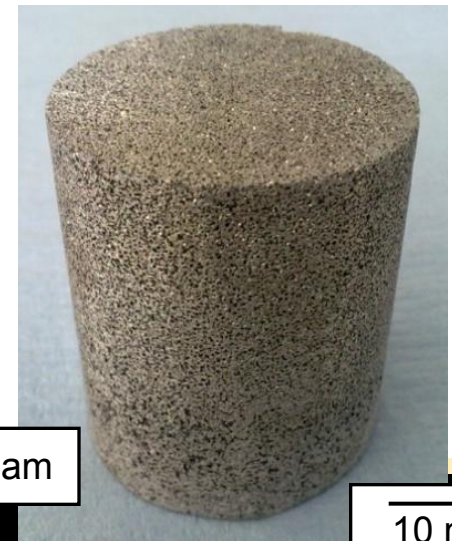
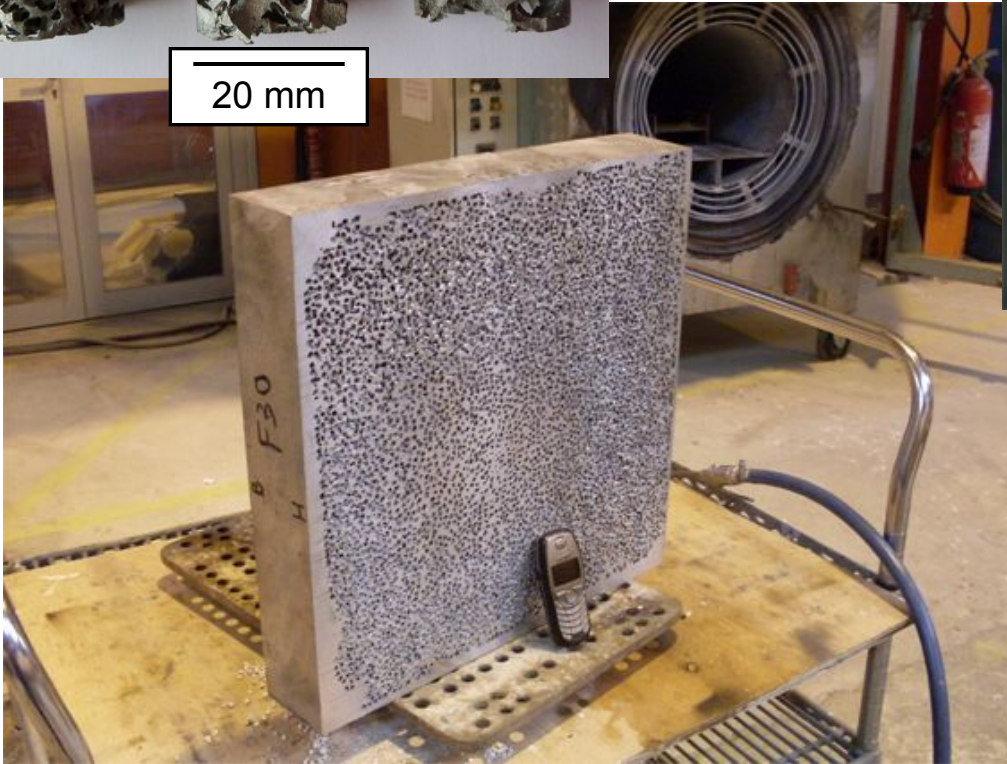


Al foams

20 mm



Ti foam

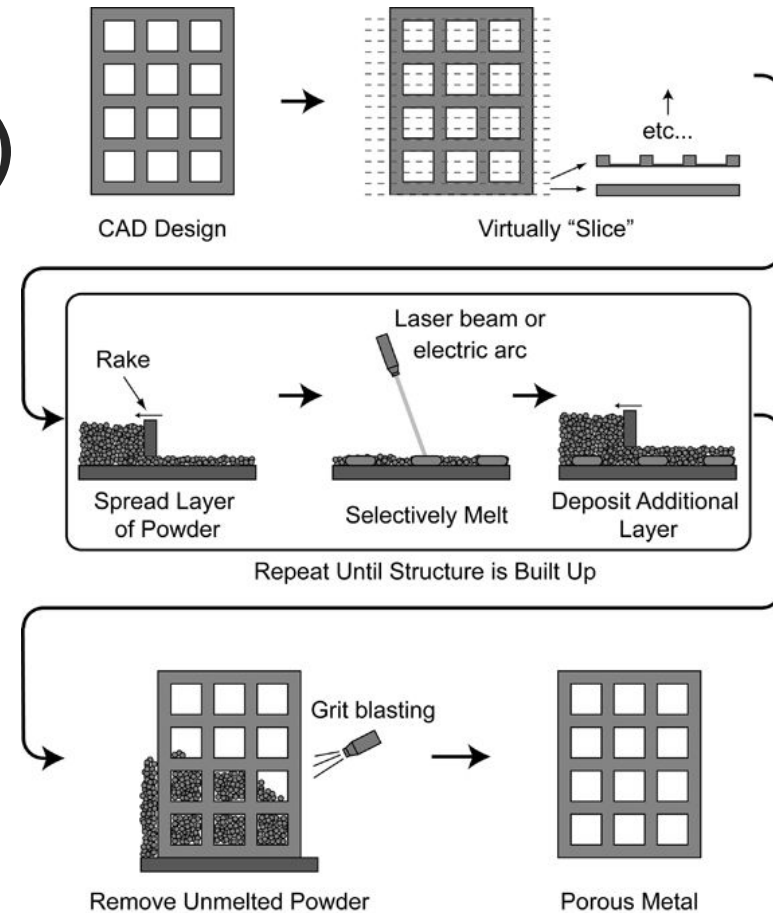
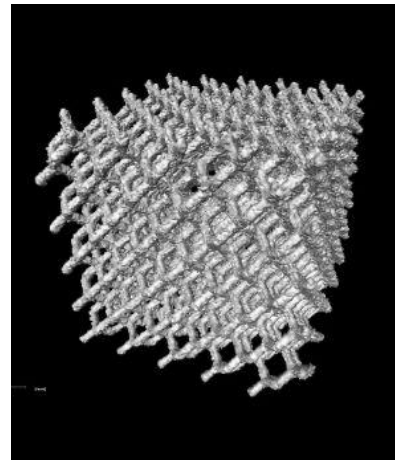
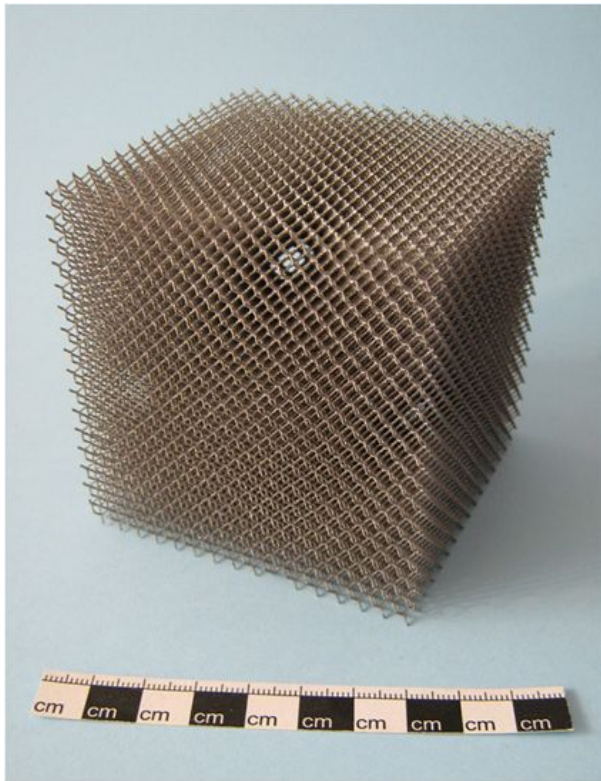


Mg foam

10 mm

Lattices

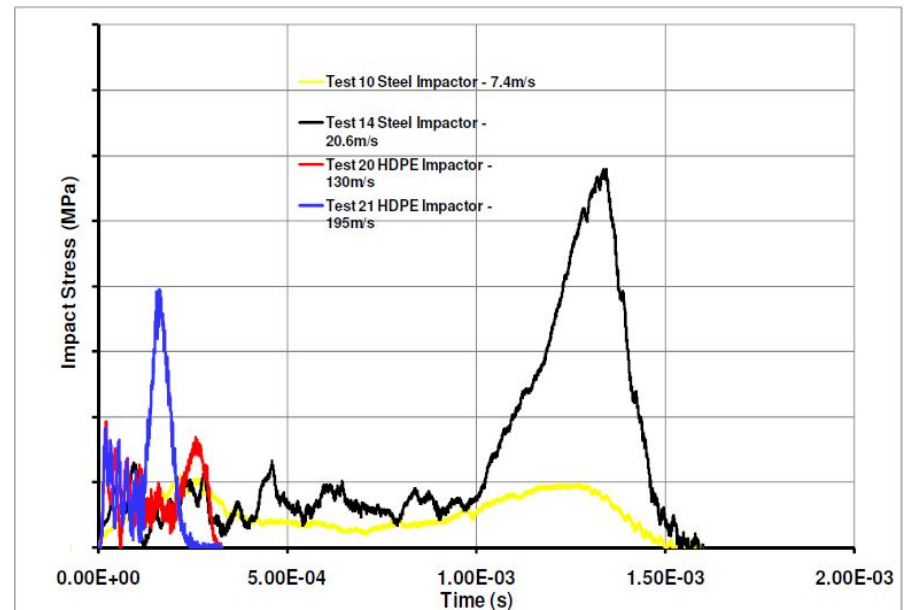
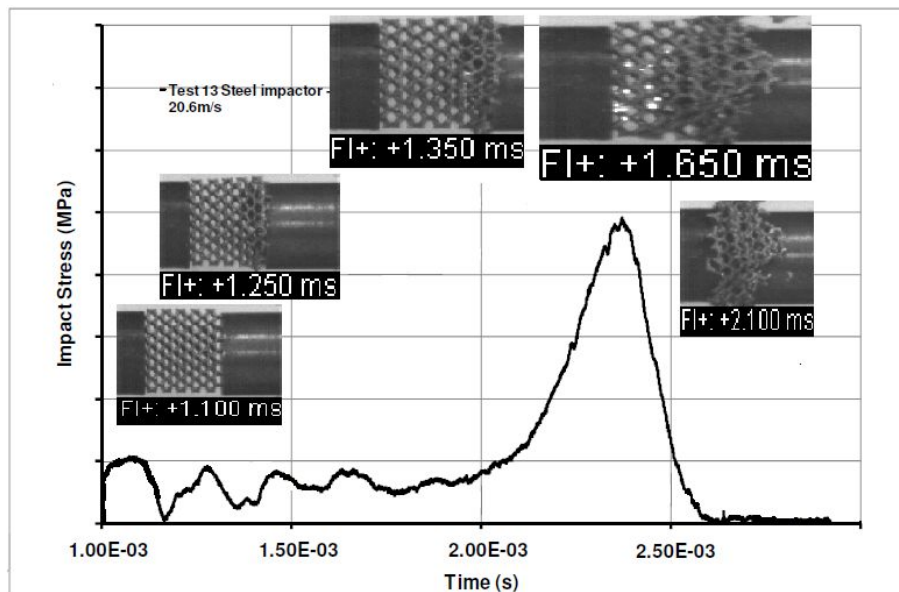
Methods such as *Additive Layer Manufacturing* are suitable for regular lattices (**Mercury Centre**)



Lattices - impact resistance

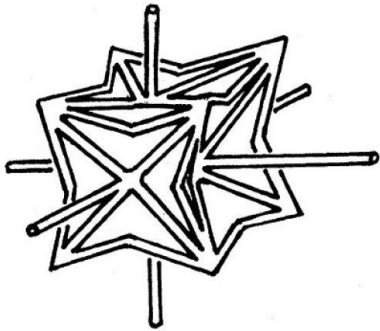
With colleagues in Civil & Structural Engineering we are examining the impact properties of these materials

(CDE project DSTLX1000054230 - Spatial and Temporal Spreading of Mine Loading Using Micro-Structured Truss Material)

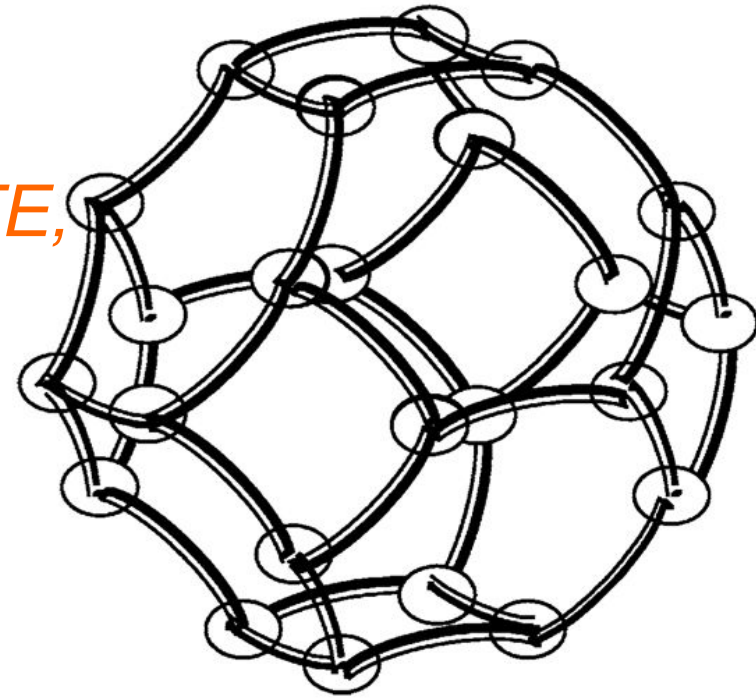
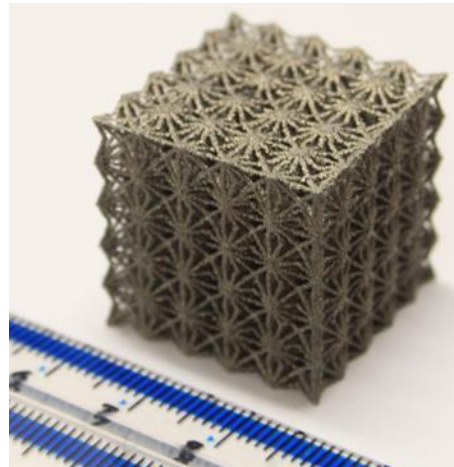


Lattices – other properties

- Tailoring structure allows interesting behaviours to be designed in – *e.g auxetic materials*
- **Multimaterial** structures would allow even more - *controlled CTE, etc*



R Lakes, Science 235
(1987) 1038



R Lakes, Applied Physics Letters 90
(2007) 221905