Porous Metals – *Sponges and Lattices*

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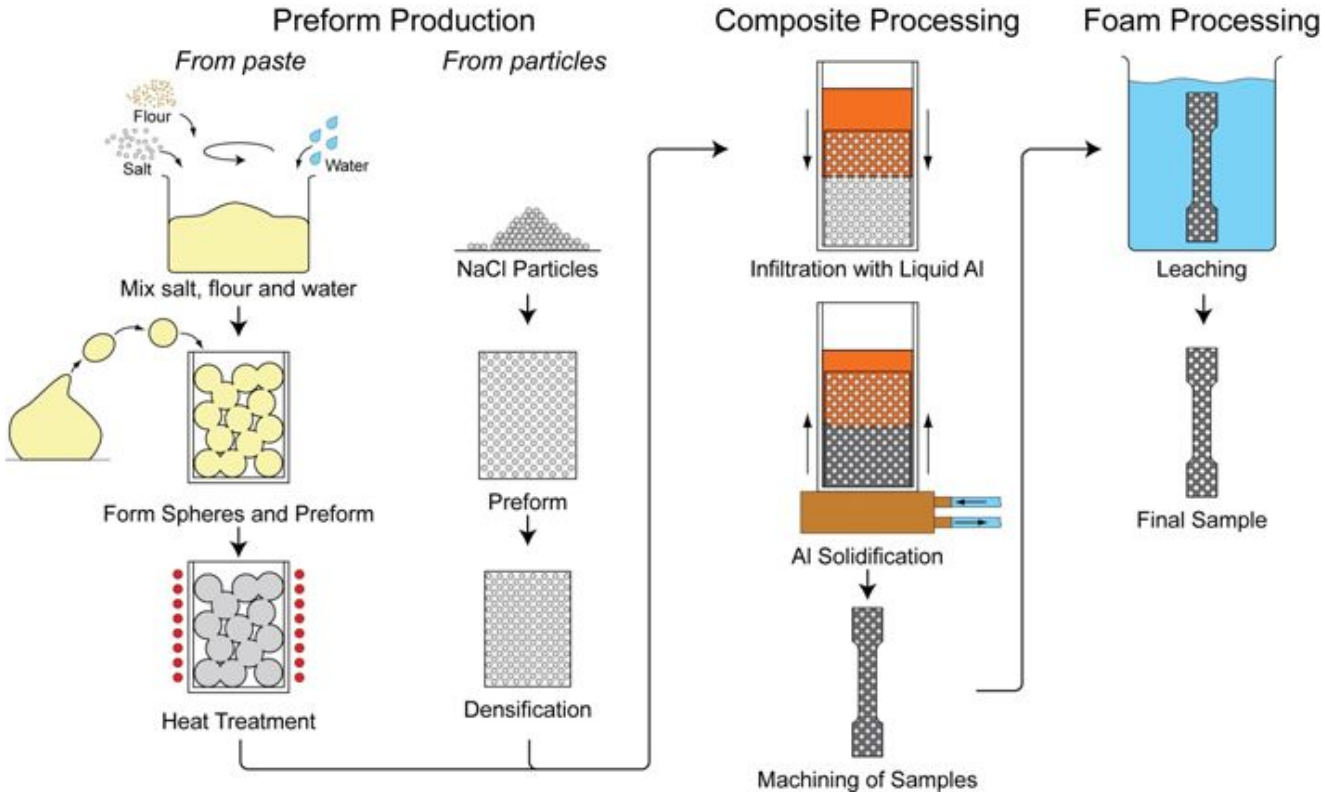
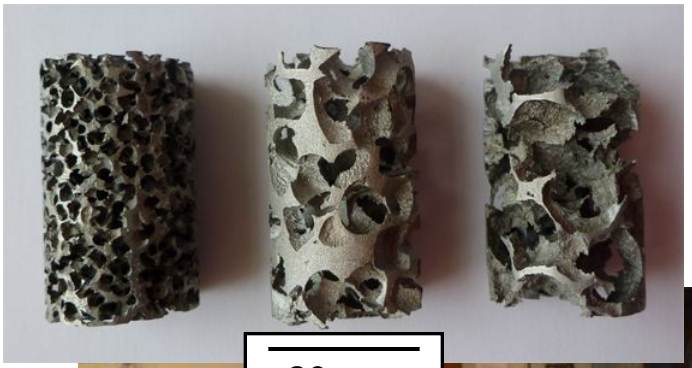
Sponge Metals @ Sheffield – SM@Sh

Sponge Metals

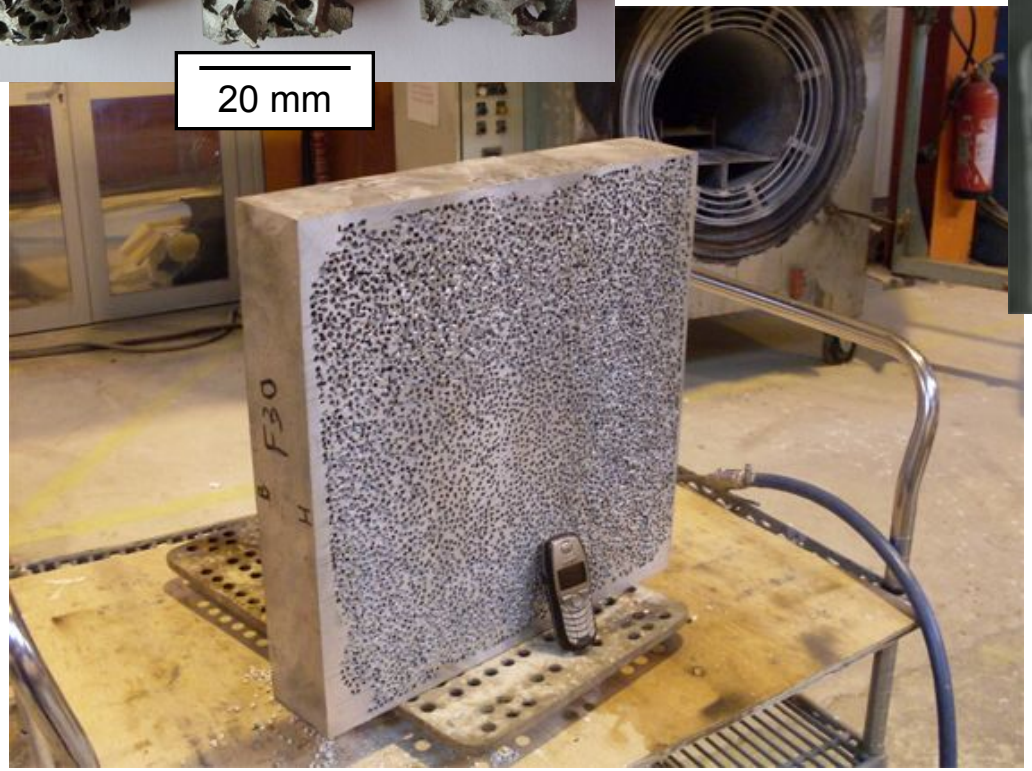
- Applications include: Lightweight structures, impact resistance, heat transfer
- Made by a simple process - *Replication*

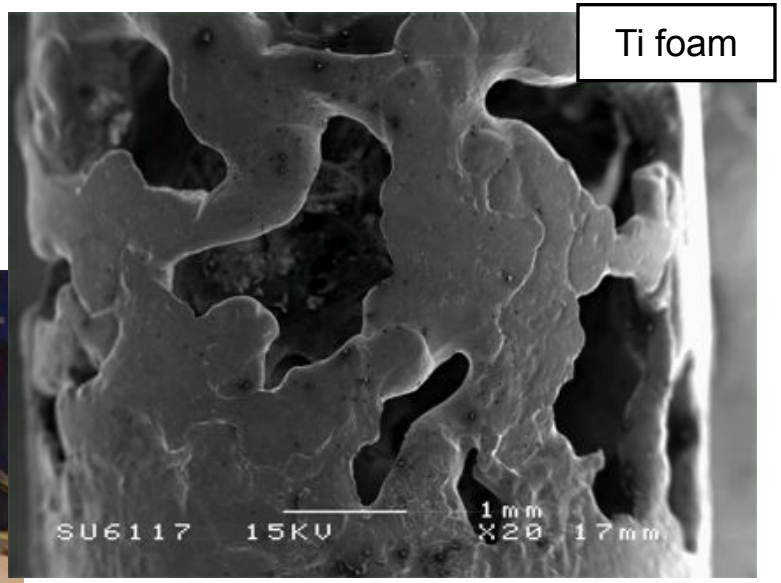


Sponge Metals

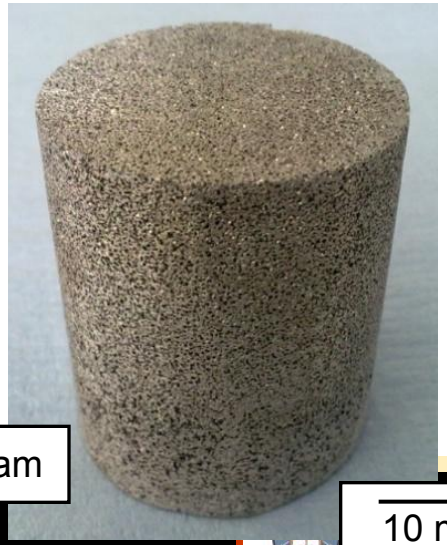


Al foams





Ti foam

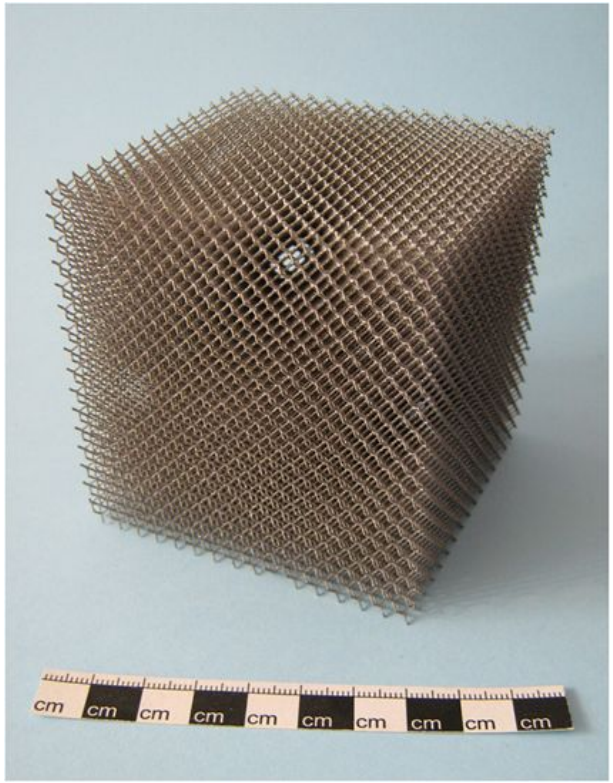


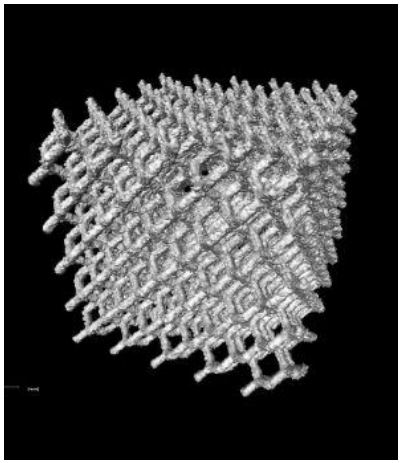
Mg foam

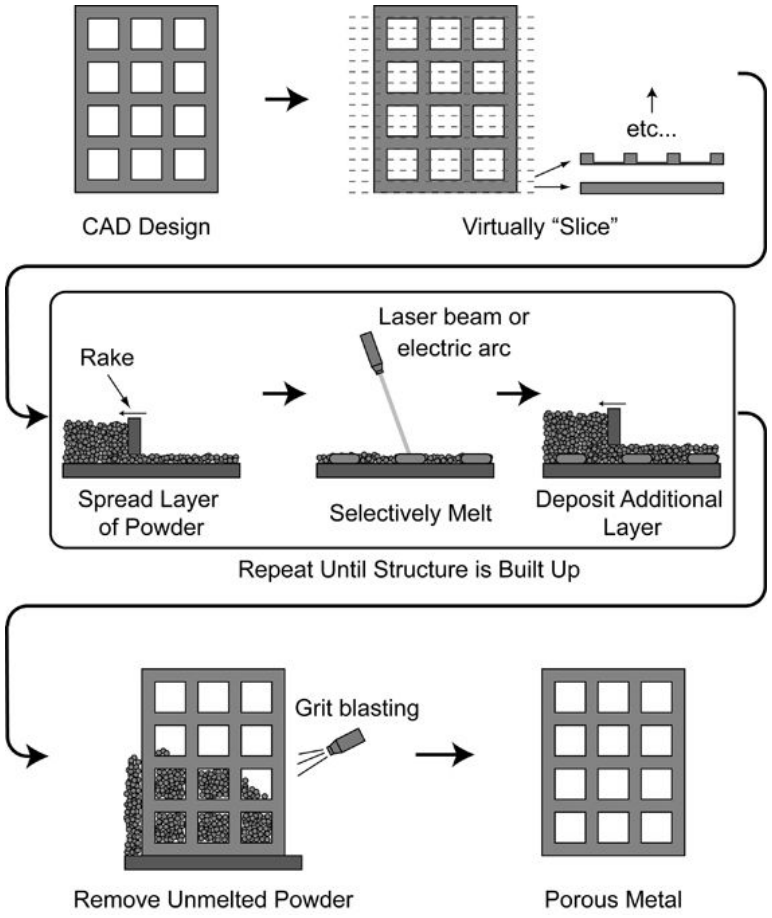
10 mm

Lattices

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



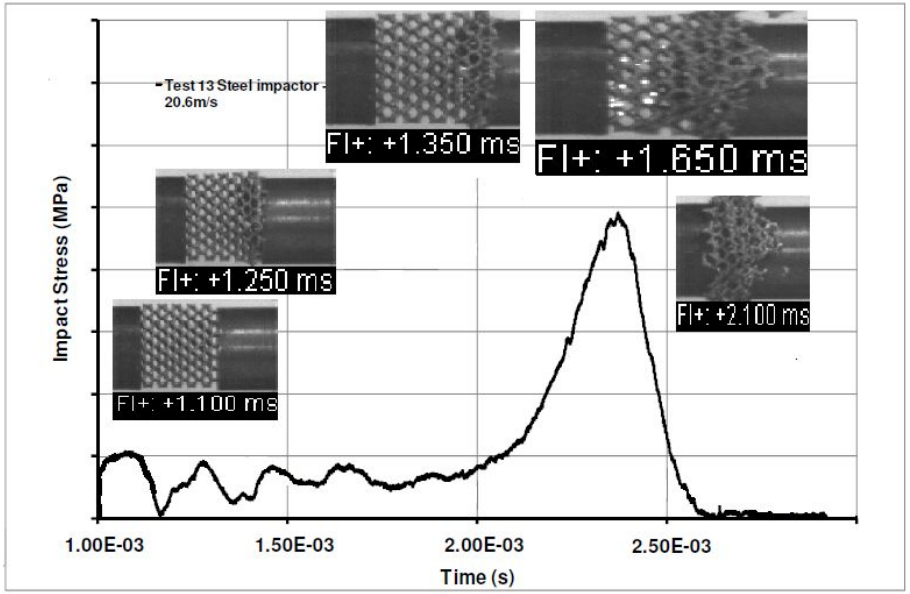


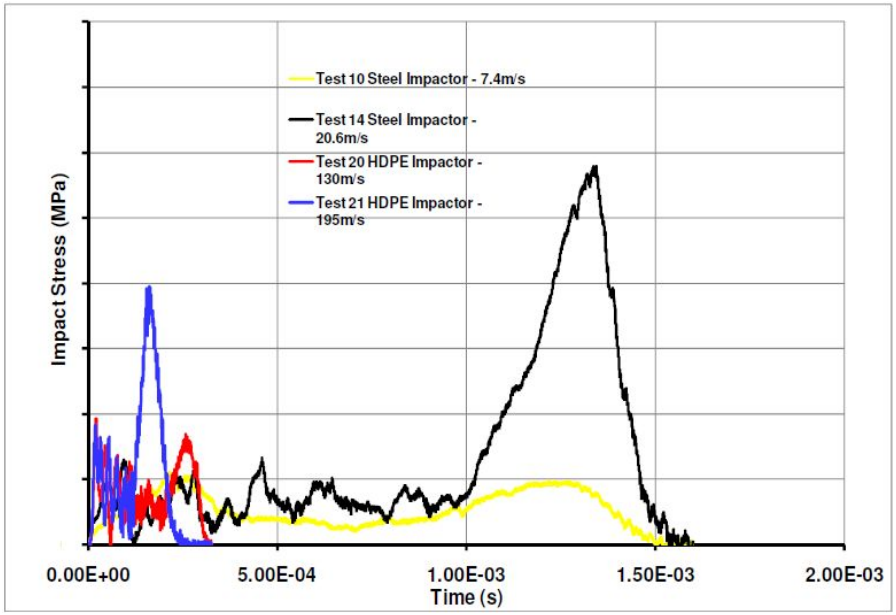


Lattices - impact resistance

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

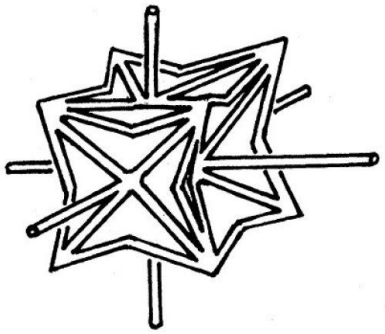
(CDE project DSTLX1000054230 - Spatial and Temporal Spreading of Mine Loading Using Micro-Structured Truss Material)



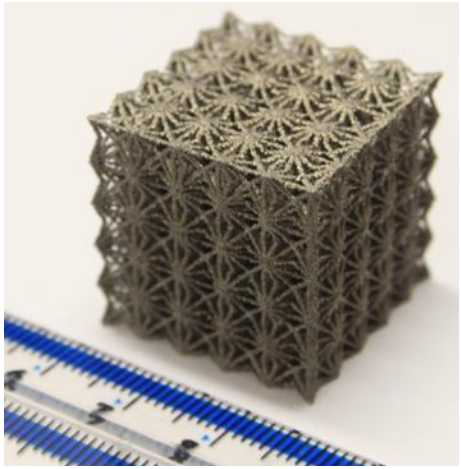


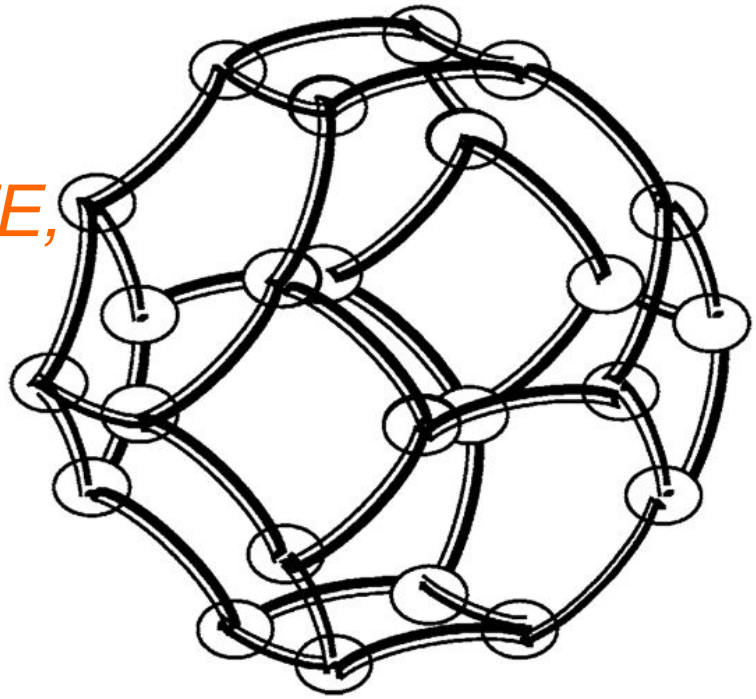
Lattices – other properties

- 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*