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Cellular Metals: Fabrication, Properties and Applications

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Cellular solids and porous metals have become some of the most promising lightweight multifunctional materials due to their superior combination of advanced properties mainly derived from their base material and cellular structure. They are used in a wide range of commercial, biomedical, industrial, and military applications. In contrast to other cellular materials, cellular metals are non-flammable, recyclable, extremely tough, and chemically stable and are excellent energy absorbers. The manuscripts of this Special Issue provide a representative insight into the recent developments in this field, covering topics related to manufacturing, characterization, properties, specific challenges in transportation, and the description of structural features. For example, a presented strategy for the strengthening of Al-alloy foams is the addition of alloying elements (e.g., magnesium) into the metal bulk matrix to promote the formation of intermetallics (e.g., precipitation hardening). The incorporation of micro-sized and nano-sized reinforcement elements (e.g., carbon nanotubes and graphene oxide) into the metal bulk matrix to enhance the performance of the ductile metal is presented. New bioinspired cellular materials, such as nanocomposite foams, lattice materials, and hybrid foams and structures are also discussed (e.g., filled hollow structures, metal-polymer hybrid cellular structures).

