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Fabrication and application of microlattices made by additive manufacturing

In recent years, cellular structures have found wide applications such as light-weight materials, catalysts, electrodes, energy absorbers and sound absorbers and heat separators. Additive manufacturing has provided the platform for fabrication of cellular structures with geometries which are not possible to be obtained using conventional fabrication techniques. Among many unique cellular structures, micromesh and microlattice have been widely investigated by additive manufacturing. Unique mechanical properties have been reported in microlattice for applications including light-weight, energy absorption etc.In our recent studies, we have paid particular attention for other applications, such as electrochemical electrode and unique filter.The cellular structure has shown promising results for various applications, including water splitting, electrochemical separation of heavy metal ions. More recently, we have successfully developed a novel magnetic separator for high-efficiency removal of heavy metal ions. Unique magnetic mesh plus quasi-superparamagnetic nanoparticles enables removal of heavy metal ions at low magnetic field (< 1 kOe). Soft-magnetic mesh can be easily recovered for reuse, while heavy ions can be removed by suitable pH values. Compared to relatively expensive regeneration of ion-exchange, the newly developed magnetic separation is promising for practical applications.

Biography

Jun Ding is Professor at Department of Materials Science & Engineering, National University of Singapore. He has been working on functional materials (particularly magnetic materials) over 25 years. His current research is focusing on additive manufacturing (3D printing) with the emphasis of advanced functional and multi-functional devices.

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