Building Self-supporting Battery Electrodes with Precursor-Derived Ceramics

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Molecular precursor derived ceramics (PDCs) have garnered intense research interest as potential standalone as well as composite electrode materials for rechargeable Li-ion batteries and supercapacitors. PDC based electrodes offer high surface area, improved electrical conductivity by heteroatom modification, and mechanical toughness along with added value of mass production. Here, we will present data on recent success in direct fabrication of self-standing molecular precursor-derived silicon oxycarbide (SiOC) ceramic electrodes by two different routes--electrospinning and additive manufacturing. We will show that micro and nano-structuring of PDCs is an effective strategy in improving capacity and cycling stability of Li-ion cell.