

Form Factor-Free, Printed Rechargeable Power Sources

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Forthcoming wearable/flexible electronics with shape diversity and mobile usability have garnered significant attention as a kind of disruptive technology to drastically change our daily lives. Conventional cell assembly and materials have pushed the batteries to lack of variety in form factors, thus imposing formidable challenges on their integration into versatile-shaped electronic devices. Here, we present a new class of form factor-free, printed power sources with aesthetic versatility that lie far beyond those achievable with conventional battery technologies. The printed batteries are fabricated on arbitrary objects of complex geometries through a variety of simple, low-cost and scalable printing processes. A key-enabling technology for the printed battery systems is to design battery inks, with a focus on their rheology and electrochemistry. Particular attention of this talk is devoted to discussing effects of the battery inks on printing processability, microstructure (focusing on bicontinuous ion/electron transport channels) and electrochemical performance of the resultant printed batteries.