B-site engineered hollow spheres of cubic perovskite $KNi_{1-x}Co_xF_{3-\delta}$ (x=0.2) as a potential candidate for electrochemical capacitors

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Perpetual escalation in energy demand and scarcity of supply have drawn attention towards sustainable energy devices. Electrochemical capacitors have emerged as an ineluctable substitute to the current energy storage systems because of their ability to deliver high power density and high charge/discharge rates. Perovskite oxides have gained much attention as an electrode material for solid-oxide fuel-cell but lately, perovskite oxides have stimulated the interest of researchers because of their characteristic to store charge through anion intercalation. Herein, we report the synthesis of hollow spheres of cubic perovskite KNi1-xCoxF3-δ (x=0.2) as an anion-intercalated electrode material which yielded a specific capacitance of 1588 F g-1 at 1 A g-1. Asymmetric supercapacitor device was fabricated by coupling KNi1-xCoxF3-δ (x=0.2) with activated carbon and the device delivered maximum energy density of 45 Wh kg-1 at a power density of 825 W kg-1 along with robust cycling stability of 98% for 10k cycles. The remarkable properties of the asymmetric gadget endorse their viable relevance to the present energy demand.