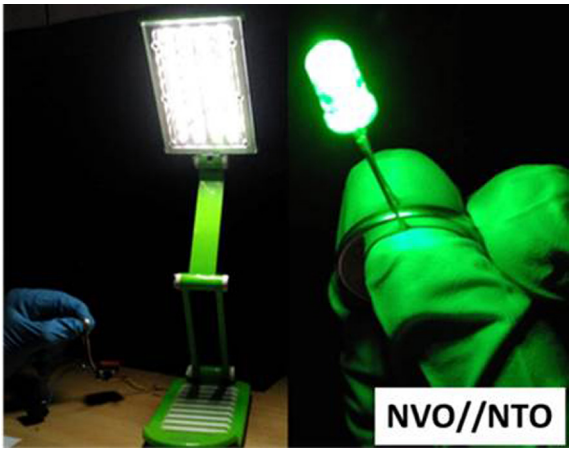
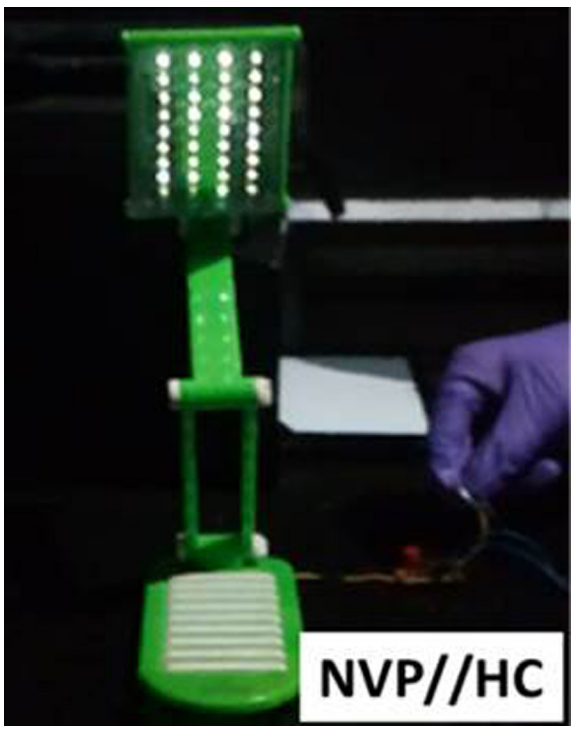
Next generation sodium ion battery: A power dream, beyond lithium





Lithium-ion battery (LIB) has been extensively used in all the portable electronic and automobiles (electrical/hybrid electrical vehicles) industry due to its capability to store and release electrochemical energy efficaciously. However, the accessible lithium resources are limited and are not well distributed throughout the world. So, we need an alternative energy storage system which can easily be available and compete with LIB to satisfy our energy/power demand at a lower price.

Sodium-ion battery (SIB), one such kind of technology, has been attracting a great interest for its low-cost and high abundance in the earth crust with a uniform distribution. Since the last few years, our lab has been developing all the three basic components in SIB like cathode, anode and electrolyte to construct a SIB battery cell prototype.

Recently, we developed a new full-cell chemistry for SIB that combines $NH_4V_4O_{10}$ (NVO) cathode and $Na_2Ti_3O_7$ (NTO) anode. The battery prototype provides a high-energy density of 340 Wh kg^{-1} with outstanding cycling stability compared to the existing commercial LIBs. Recently, we demonstrated the prototype performance of sodium ion full-cell based on $Na_2V_3(PO_4)_3$ (NVP) cathode & hard carbon (HC) anode and, NVO cathode and NTO anode.

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