

Development of novel, reliable and cost-effective aluminium-nickel high-capacity intermetallic batteries for stationary utility-scale energy storage applications

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Global Warming has become a major concern throughout the world, to mitigate this issue of climate change we need large scale development & implementation of energy policy, which steps us towards for reducing CO₂ emissions. Battery is one of such technology that offers sustainable supply chain based on the renewable. Though LIBs have the higher energy density, high discharge power, high columbic efficiency, the limited resources of the lithium restrict the large scale development of these batteries also it gets deposited as dendrites while charging. As raw material is the main pillar of the development of battery, we need an earth abundant and cheap material, Al is one of them, It is the 3rd most abundant metal in the planet and India has 5th largest Bauxite reserve in the world. This project proposes the Al-Ni intermetallic batteries, which prevented the drawbacks of dendritic formation, where Ni used as positive electrode. As during discharging the Al deposited to the Ni side and forms several intermetallic, and while charging the Al again deposit as pure Al. In our work Several intermetallic has formed after discharging like AlNi, Al₃Ni₂, AlNi₃ and charging Ni electrode comes back to original state as pure Al deposits back to the anode side. It shows very good capacity retention and discharge capacity even after 200 cycles.