Supporting Information:

Nickel Ferrite as Stable, High Capacity and High rate Anode for Li-ion Battery Applications

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Figure S1 shows the FTIR spectrum of the pure NiFe\textsubscript{2}O\textsubscript{4} nanoparticles. From figure S1, the absorption bands in the range of 3250-3500 cm\textsuperscript{-1} and 1636 cm\textsuperscript{-1} is typically due to functional groups OH. The peaks should be assigned to water molecules absorbed by the sample or KBr. The presence of Ni-O and Fe-O bonds in the NiFe\textsubscript{2}O\textsubscript{4} nanoparticles is confirmed by the characteristic peaks appeared at 591 cm\textsuperscript{-1} and 476 cm\textsuperscript{-1}, which represents the presence of pure nanocrystalline NiFe\textsubscript{2}O\textsubscript{4}. 
Figure S2: a) life cycle performance at 91 mA g⁻¹ and b) Charge/ discharge cycles at different rates of NiFe₂O₄ nanoparticles with CMC binder.
Figure S3: a) power cycle performance and b) Charge/ discharge cycles at different rates of NiFe$_2$O$_4$ nanoparticles with CMC binder.
Figure S2 show the cyclic performance and charge /discharge cycles of NiFe$_2$O$_4$ nanoparticles with CMC binder at 0.1C (91 mA g$^{-1}$) rate. From figure S2a, observed capacity fading might be due to the low adherence properties of CMC binder which will lead volume changes in anode while charging and discharging. In the first cycle, NiFe$_2$O$_4$ nanoparticles with CMC binder electrode have a discharge capacity of 878 mAh g$^{-1}$ and after 30 cycles, it delivering only 225 mAh g$^{-1}$. Furthermore, in figure 2b, the discharge profiles are not showing any voltage plateau, probably because of reduction in crystallinity and/or change in surface site energetics during the formation process of the composite.

Figure S3 shows the cyclic performance and charge discharge cycles at different current rates of NiFe$_2$O$_4$ nanoparticles with CMC binder. From figure 3a, high capacity fading is observed in all current rates. From figure 3b, observed capacities of NiFe$_2$O$_4$ nanoparticles with CMC at 1C, 2C, 5C, 10C and 20C were found to be 886 mAh g$^{-1}$, 671 mAh g$^{-1}$, 538 mAh g$^{-1}$, 426 mAh g$^{-1}$ and 334 mAh g$^{-1}$, respectively.