## Construction of sandwiched graphene paper@Fe<sub>3</sub>O<sub>4</sub> nanorod array@graphene

## for large and fast lithium storages with extended lifespan

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Fig. S1 SEM image of FeOOH nanorods.



Fig. S2 SEM image of Fe<sub>3</sub>O<sub>4</sub> obtained by annealing pristine FeOOH nanorods.



Fig. S3 The first and second galvanostatic charge/discharge profiles of graphene paper at current

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density of 0.2 A g<sup>-1</sup>.
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Fig. S4 Cyclic performance of graphene paper at current density of 0.2 A g<sup>-1</sup>. It is clearly shown that the G paper delivers good cyclic stability. The pristine G paper exhibits initial discharge capacity of 1069 mAh g<sup>-1</sup> and charge capacity of 405 mAh g<sup>-1</sup>, delivering a low initial columbic efficiency of 37.9%. The reversible discharge capacity decreases rapidly to 248 mAh g<sup>-1</sup> at the 6th cycle, and then keeps stable till the 85th cycle (251 mAh g<sup>-1</sup>). After that, the capacity increases slightly to 280 mAh g<sup>-1</sup>



at the 107th cycle and keeps stable till the 200th cycle.

Fig. S5 SEM image of GPFG after 300 cycles of electrochemical test.