**Development of core-shell structured HCNF/Si anode material via coaxial electrospinning technique for new generation of lithium ion batteries**

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Silicon hollow carbon nanofiber (HCNF) anode materials can be considered as a promising alternative for the conventional graphite electrode due to its 10 times higher theoretical capacity (4200 mAh $g^{-1}$ vs 372 mAh $g^{-1}$). However, it suffers from the fast capacity loss and limited cycle life because of volume expansion of Si at the lithiation process, therefore a considerable amount of Li ions is irreversibly trapped in the Si active sides. Generally, HCNF with its unique structure could withstand large volume change of Si.

Nanofibers were obtained by coaxial electrospinning technique by using PMMA as core and PAN as shell polymers. Porous structured CNFs were produced by decomposition of PMMA after stabilization at 280°C followed by carbonization processes at 800°C in the Ar atmosphere. To the fabrication of hollow structure, CNFs were activated by KOH. The SEM image in Fig.1a shows the HCNF have pores, while the TEM image demonstrates that this hole is continuous inside the nanofibers and has nanovoids on the surface of fibers. Incorporation of Si within these voids by Si-PMMA core solution might be a promising solution for the volume expansion problem.

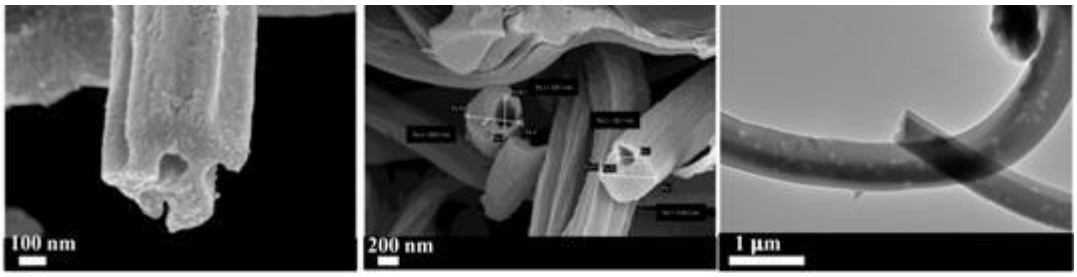


**Figure 1. (a), (b) SEM image of HCNF, (c) TEM image of HCNF**

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