Table 1 reports the performance of different GPEs prepared by different preparation processes. In general, all GPEs have wide electrochemical stability window (ESW). The electrochemical stability window of the first three GPEs exceed 5V which is high enough for the GPE to be combined with most cathode material in lithium batteries. And most of the Li/LFP battery which used GPE owns a high initial discharge capacity. In addition, polymer electrolytes based on ionic liquids offer high ionic conductivity (with a range of $10^{-4}$ to $10^{-3}$ S/cm at 25 ℃), which usually higher than solid polymer electrolyte(SPE). However, there is still room for the improvement of ionic conductivity of GPEs.

In this work we obtained micro-porous polymer membrane by adopting solvent casting method, in which hairy micro-porous serve as rapid migration channels to Li$^+$ and thus providing high ionic conductivity.