



**MORPHOLOGY AND ELECTROCHEMICAL PROPERTIES OF ELECTROSPUN POLYMER
ELECTROLYTE BASED ON PVDF/PAN BLEND FOR LITHIUM POLYMER BATTERY: EFFECTS OF
BLEND COMPOSITION, VOLTAGE AND SOLUTION CONCENTRATION**

Fatemeh Hakkak, Mehdi Rafizadeh, Ali Asghar Sarabi,

Polymer Engineering and Color Technology, Amirkabir University of Technology

mehdi@aut.ac.ir

Polymer electrolytes based on a blend of polyvinylidene fluoride and polyacrylonitrile (PVdF/PAN) were prepared by electrospinning technique at room temperature. The effect of PVdF/PAN ratio, voltage and solution concentration for electrospinning process on the morphology and electrochemical properties of prepared nanofiber were investigated. The morphology of electrospun nanofibers, the ionic conduction and electrochemical stability of prepared electrolytes were characterize by scanning electron microscopy (SEM), electrochemical impedance spectroscopy (EIS) and linear sweep voltametry (LIS), respectively. SEM images clearly inform that nanofibers of pure PVdF or PAN have uniform diameters and smooth surfaces; however, PVdF/PAN nanofibers have interconnected multi-fibrous layers with ultra fine porous structures. The results of electrochemical measurement of prepared samples indicate that these interconnected morphology of PVdF/PAN result in higher liquid electrolyte uptake and therefore higher ionic conductivity, effective lithium ion transport and good interfacial characteristics with lithium electrode. The results reported here indicate that PVdF/PAN electrolytes have complementary advantageous characteristics of PVdF and PAN, and so the performance characteristics of PVdF/PAN as polymer electrolytes in lithium batteries are much superior to the electrolytes of pure PVdF or PAN.