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Development of Cellulose/PVDF-HFP Composite Membranes for Advanced Battery Separators ALEJANDRO CASTILLO, VICTOR AGUBRA, MATAZ ALCOUTLABI, YUANBING MAO, University of Texas Rio Grande Valley — Improvements in battery technology are necessary as Li-ion batteries transition from consumer electronic to vehicular and industrial uses. An important bottle-neck in battery efficiency and safety is the quality of the separators, which prevent electric short-circuits between cathode and anode, while allowing an easy flow of ions between them. In this study, cellulose acetate was dissolved in a mixed solvent with poly(vinylpyrrolidone) (PVP), and the mixture was forcespun in a peudo paper making process to yield nanofibrillated nonwoven mats. The mats were soaked in NaOH/Ethanol to strip PVP and regenerate cellulose from its acetate precursor. The cellulose mats were then dipped in poly(vinylidenefluoride-co-hexafluoropropylene) (PVDF-HFP) to yield the cellulose/PVDF-HFP composte membranes. These membranes were characterized chemically through FTIR spectroscopy and solvent-stability tests, thermally through DSC, physically by stress/strain measurements along with weight-based electrolyte uptake, and electrically by AC-impedance spectroscopy combined with capacitative cycling.

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