Effect of electrode's mass on the electrochemical properties of $Ni_3(HITP)_2$ supercapacitors fabricated by electrophoretic deposition

*Darien K. Nguyen and Fatima Amir
Research Associate, Assistant Professor
Winthrop University

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Abstract: Metal-organic frameworks are 2D materials that are of significant interest because of their promising applications in energy storage devices. Herein, we report the fabrication of the MOF Nickel-2,3,6,7,10,11-Hexaaminotriphenylene ($Ni_3(HITP)_2$) supercapacitors by electrophoretic deposition (EPD). The $Ni_3(HITP)_2$ were deposited onto targeted substrates, with masses ranging between 0.35mg and 1.75 mg. The resulting $Ni_3(HITP)_2$ exhibited excellent electrochemical capacitive performance over a potential window of 0.0-1.0V, operating at ultra–high charge-discharge rates, up to 4000 mV s^{-1}. The $Ni_3(HITP)_2$ supercapacitors exhibited excellent areal specific capacitance of 15.69mFcm^{-2} and 63.54mFcm^{-2} for masses of 0.35mg and 1.75mg respectively. The $Ni_3(HITP)_2$ supercapacitors exhibited an exceptional ultra-long cycling stability after 100,000 cycles. The results pave a promising route for the next–generation of electric double layers capacitors (EDLCs) based on non-carbon active materials.