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As energy demands continue to outpace energy supply, inexpensive and effective energy storage mechanisms have become a necessary component to a long-term solution to this energy crisis. Polylactic acid (PLA), a biodegradable, non-petroleum-derived polymer, can be combined with conductive materials such as carbon black or nanofibrillar polyaniline (PANi), a semiconducting polymer, and extruded to create nanostructure composite filaments for use in 3D printing. The polyaniline and polylactic acid composite filaments can be 3D printed into electrochemical capacitors due to the redox properties of PANi. 3D printing, or fused deposition modeling, is an additive manufacturing process that minimizes material waste and can create objects of complex shapes. Filaments for 3D printing are usually either 1.75 mm or 3 mm in diameter, with filaments of 1.75 mm being the focus of this project due to its increasing popularity. A pressurized mixing extruder consisting of a pressurized reactor chamber and a 1/4" NPT ball valve has been designed and created to facilitate the filament-making process. We heated Ingeo Biopolymer 4043D PLA pellets to about 180°C, which is well above the melting point of PLA—about 140-160°C. Melt mixing PLA enabled filament extrusion, but presented challenges for homogeneous dispersion of additives. The melted mixture was too viscous to stir and adding PANi resulted in nonconductive filaments with visible clumps. To address this issue, PLA and conductive fillers will be dissolved in various solvents such as chloroform, hexaisofluoropropanol, or nitromethane to reduce viscosity and then mixed. The solvent will then be evaporated off, and then the composite material will be extruded.