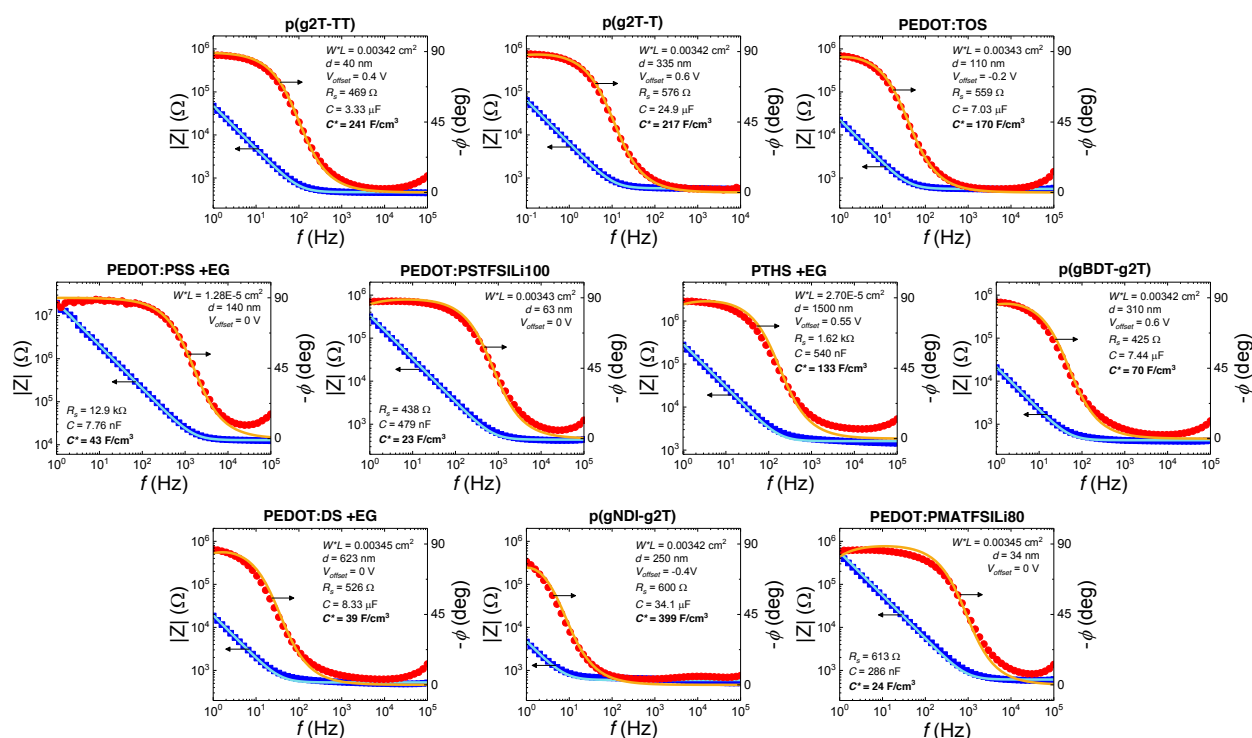


## Supplementary Figures



**Supplementary Figure 1.** Electrochemical impedance spectroscopy (Bode plots) for each material discussed in this work. As these samples are from different sets of original experiments, the specific size or thickness may not be comparable, however, the fits are representative of the data set. For each plot, the modulus of the impedance,  $|Z|$  (blue symbols), and phase (red symbols) are plotted as a function of frequency. Fits are shown as lines in light colors ( $|Z|$  fit, cyan; phase fit, orange). The results are fit to either an  $R_sC$ , or  $R_s(R_p|C)$  equivalent circuit where  $R_s$  is the electrolyte resistance,  $R_p$  and  $C$  describe the resistance and capacitance of the polymer film, respectively. In all cases shown, the value of  $C$  and  $R_s$  have little dependence on which circuit is chosen. The area and thickness, offset bias ( $V_{\text{offset}}$ ), and  $R_s$ ,  $C$  fit results are shown, as well as the resulting  $C^*$  value for the particular device.