

Preparation and characterization of ladder-type PEDOT-PEG PU gel polymer electrolyte

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Abstract

PEG was a chemically bonded to the hydroxyl groups of the conjugated PEDOT-OH to form the ladder type structure. PEDOT-OH was used as a new synthestic metal material for the mainframe

Dependent upon the doping -level by acid as HCl and HNO3, the optical and electrical properties of the ladder-type PEDOT-PEG PU gel polymer 3. To compare and analyze ionic conductivities of ladder PEDOT-PEG PU gel electrolytes were evaluated. Their ionic conductivities were investigated as a function of LiClO4 concentration and compared to that of individual PEG/ LiClO₄ ratio.

Objectives

- 1. To synthesis the ladder-type PEDOT-PEG PU network.
- 2. To measure the optical and electrical properties of PEDOT-PEG PU network.
- polymer electrolytes based on [O]/[Li+] ratios and pH.
- 4. The optimized a ratio of [O]:[Li+] and a pH-level to form an effective PEDOT-PEG PU gel polymer electrolyte.

Results

FT-IR

PHEDOT

PHEDOT & Supramolcular

PHEDOT-MDI-PEG supramolcular 110 **Functional** 100 **Before** After group **Transmittance** 3416 -OH -NH 3302 60 1500-2000 Urethane NH Urethane 50 2000 Wavenumber

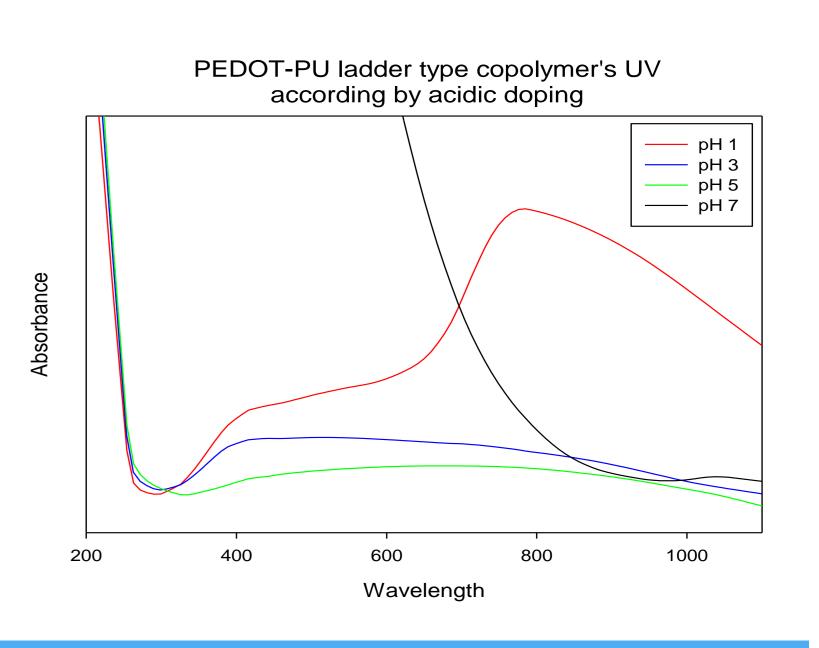
PEDOT-OH — Start 47hr 83hr 120hr 800 1000 600 Wavelength

Potential

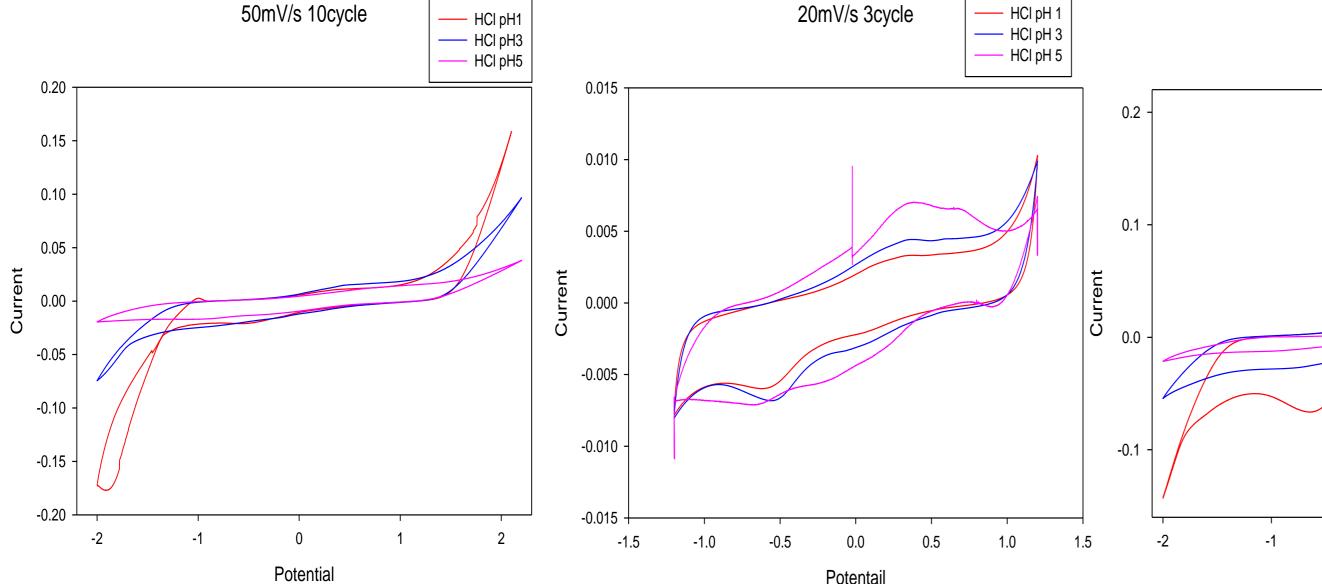
pH 1 4 ratiopH 1 8 ratio

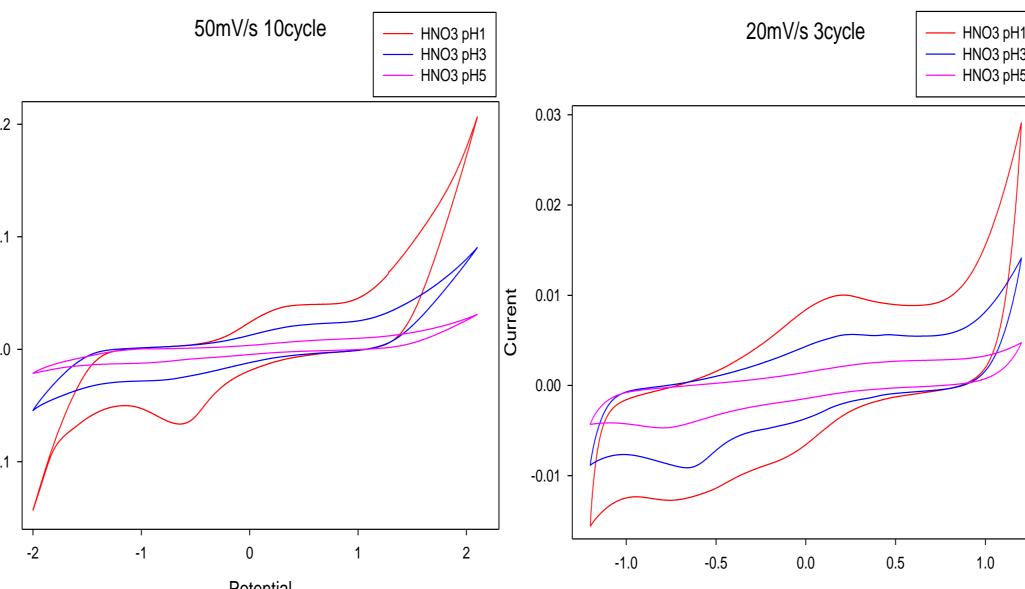
pH 1 16 ratio

pH 1 32 ratio



Cyclic Voltametry

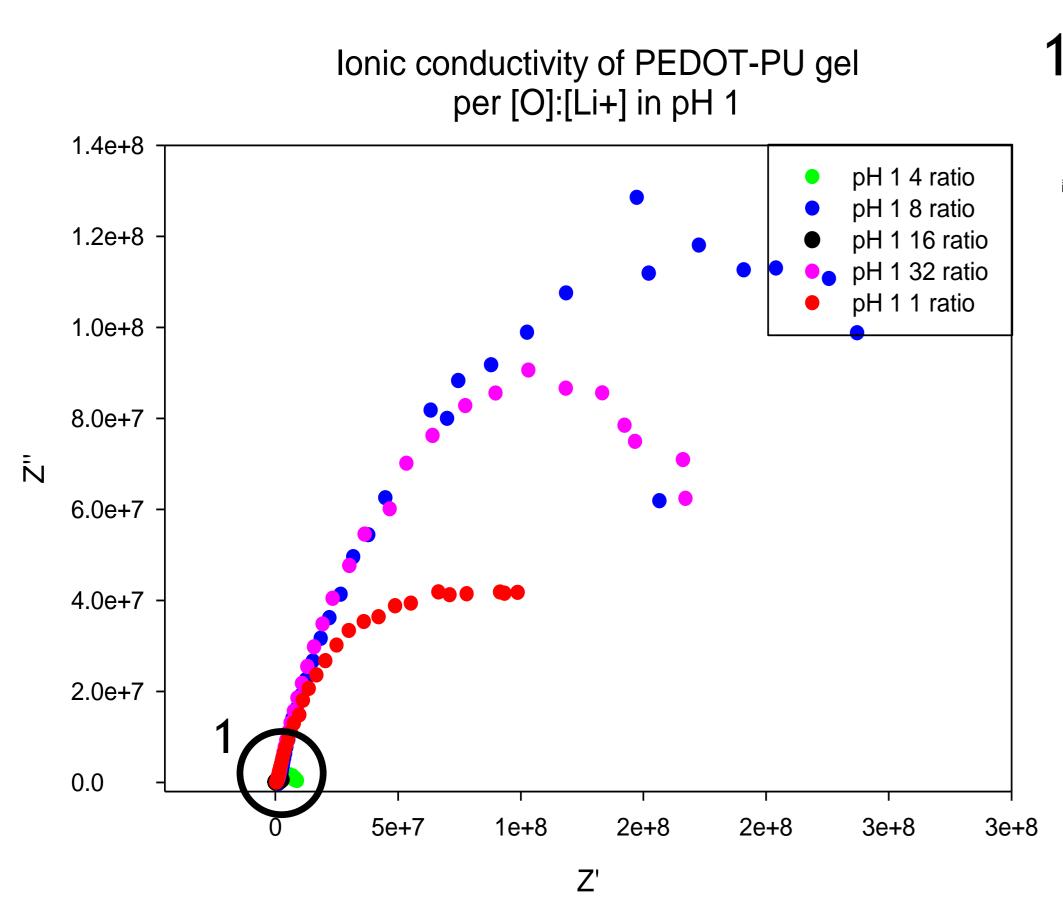


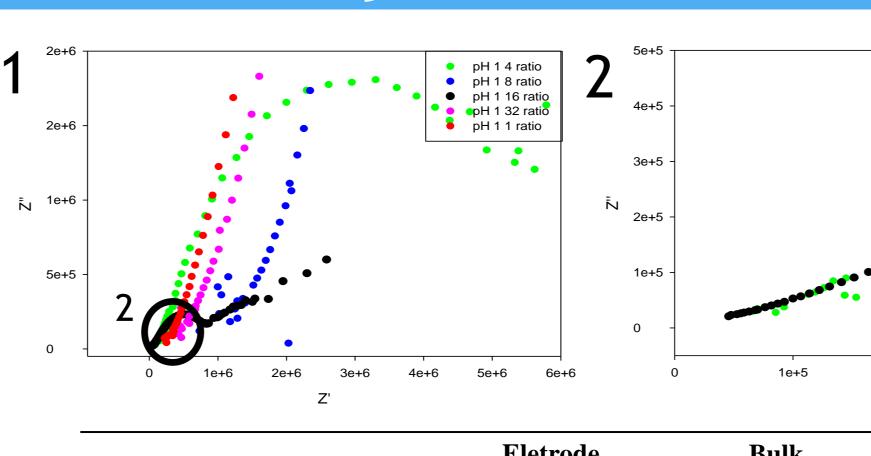


pН	Thickness (cm)	Surface Resistance (Ω/□)	Conductivity (S/cm)
5	0.0804	211.4	5.915×10^{-5}
3		44.38	2.842×10^{-4}
1		13.68	9.683×10^{-4}

Conductivity

lonic Conductivity





Ratio [O]/[Li+]	Thickness (cm)	Eletrode Surface (cm ²)	Bulk Resistance (Ω)	Ionic Conductivity (S/cm)
1			3.404×10^{5}	1.974×10^{-6}
4			1.947×10^{5}	3.451×10^{-6}
8	0.168	0.25	7.310×10^5	9.193×10^{-7}
16			8.416×10^5	7.985×10^{-7}
32			1.671×10^{8}	4.022×10^{-9}

Conclusion

- 1. The preparation of PEDOT-PEG PU polymer gel electrolyte with different pH level and [O]:[Li+] ratio
- 2. The change of electro conductivities of dependent on the pH-levels.
- 3. HNO₃ is better than HCl as a doping acid.
- ionic conductivities change of dependent on the [O]:[Li+] ratios.
- 5. [O]/[Li+]=4 is best ratio for ionic conductivity. (3.451 \times 10⁻⁶s/cm)

Acknowleghment

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