

## On Enhancing the Li-Ion Conductivity of Poly (ethylene oxide) based Electrolytes by suppressing the flexibility of Zeolitic Imidazolate Framework-8 via mixed ligand strategy

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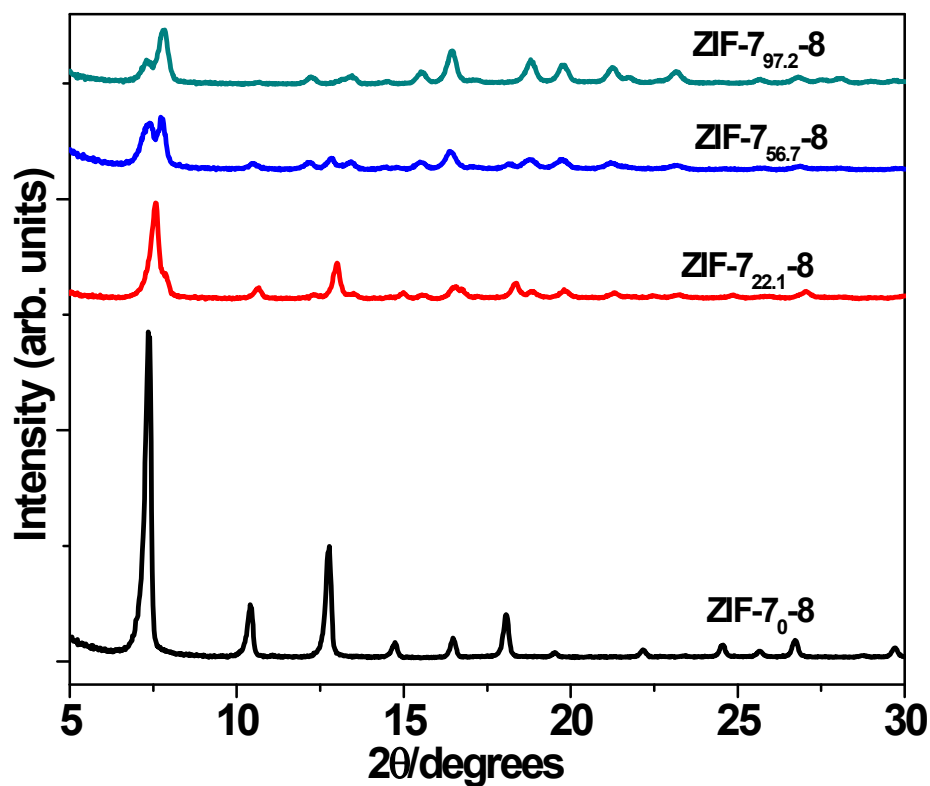
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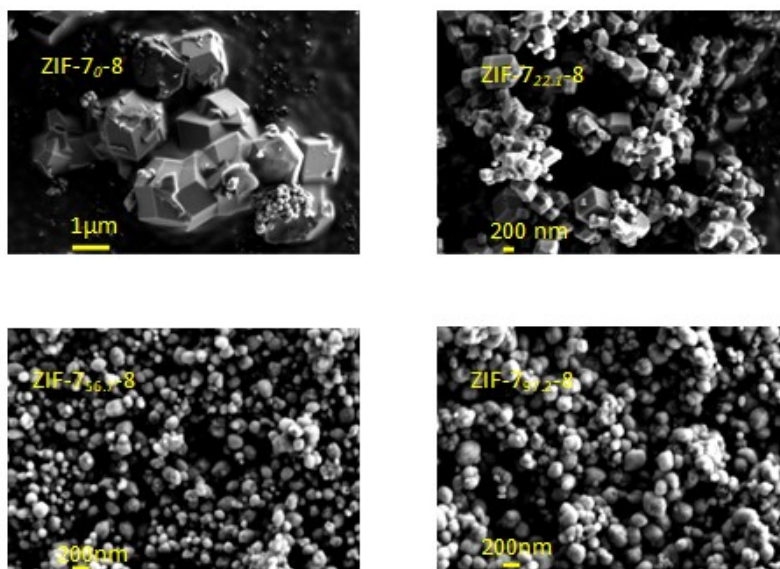
**Figure S9:** Real part of the conductivity ( $\sigma'$ ) variation with frequency (a) PEO-Li (b) PEO-Li-ZIF-7<sub>0</sub>-8 (c) PEO-Li-ZIF-7<sub>22.1</sub>-8 (d) PEO-Li-ZIF-7<sub>52.6</sub>-8 QSSEs.

**Figure S10.** Imaginary part of modulus,  $M''$ , variation with frequency for (a) PEO-Li (b) PEO-Li-ZIF-7<sub>0</sub>-8 (c) PEO-Li-ZIF-7<sub>22.1</sub>-8 (d) PEO-Li-ZIF-7<sub>52.6</sub>-8

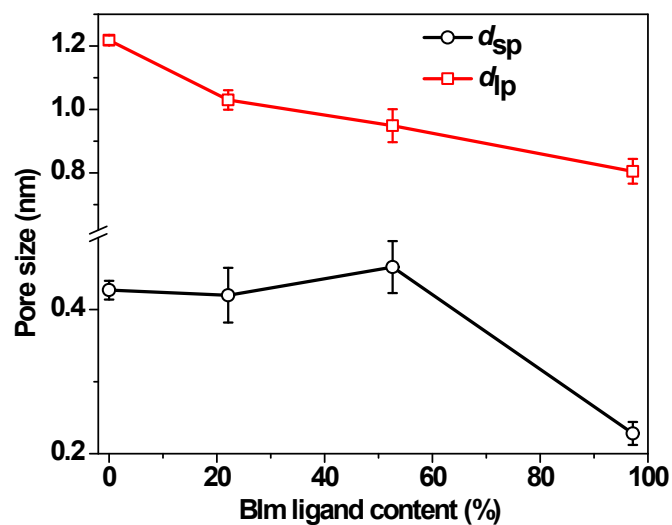
**Figure S11.** Master curve by maxima normalization technique (a) PEO-Li (b) PEO-Li-ZIF-7<sub>0</sub>-8 (c) PEO-Li-ZIF-7<sub>22.1</sub>-8 (d) PEO-Li-ZIF-7<sub>52.6</sub>-8.



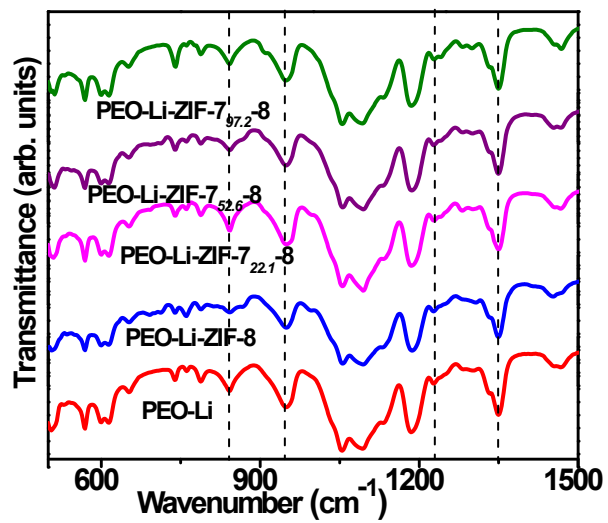
**Figure S1:** XRD patterns of the mixed ligand  $\text{ZIF-7}_x\text{-8}$  ( $x = 0, 22.1, 52.6$  and  $97.2\%$ ) frameworks. With the increase in bIm ligand, topology of the frameworks changes from ZIF-8 to ZIF-7. The random distribution of both ligands in the framework throughout the ligand mixing ratio has been confirmed in our previous study [S1].



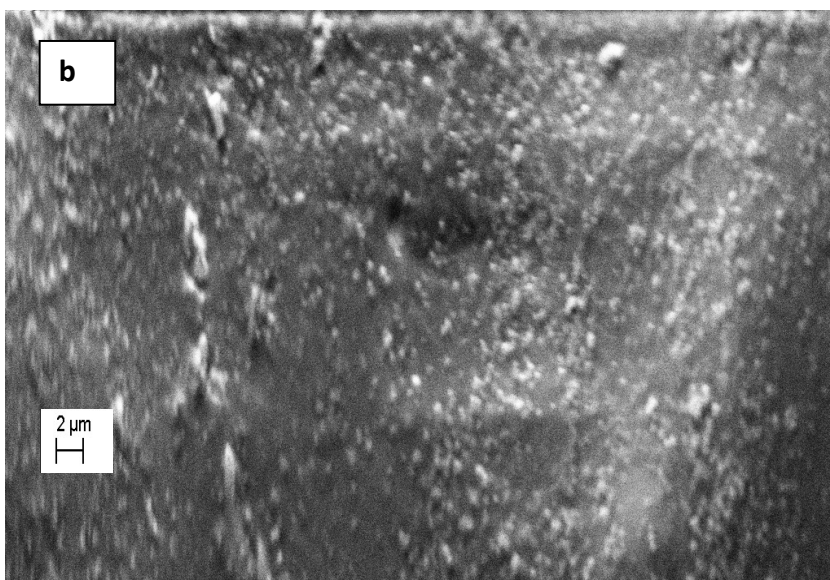
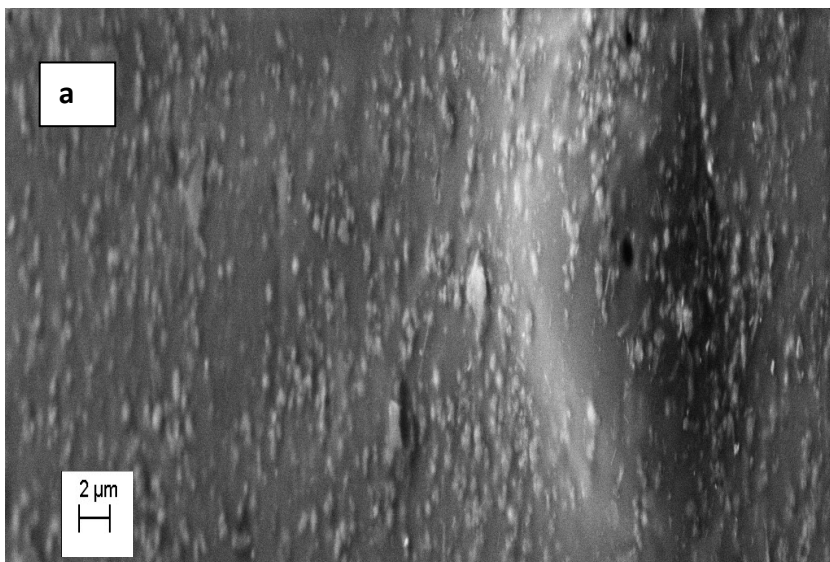
**Figure S2:** FE-SEM morphology of the mixed ligand ZIF-7<sub>x</sub>-8 (x = 0, 22.1, 52.6 and 97.2%) frameworks.



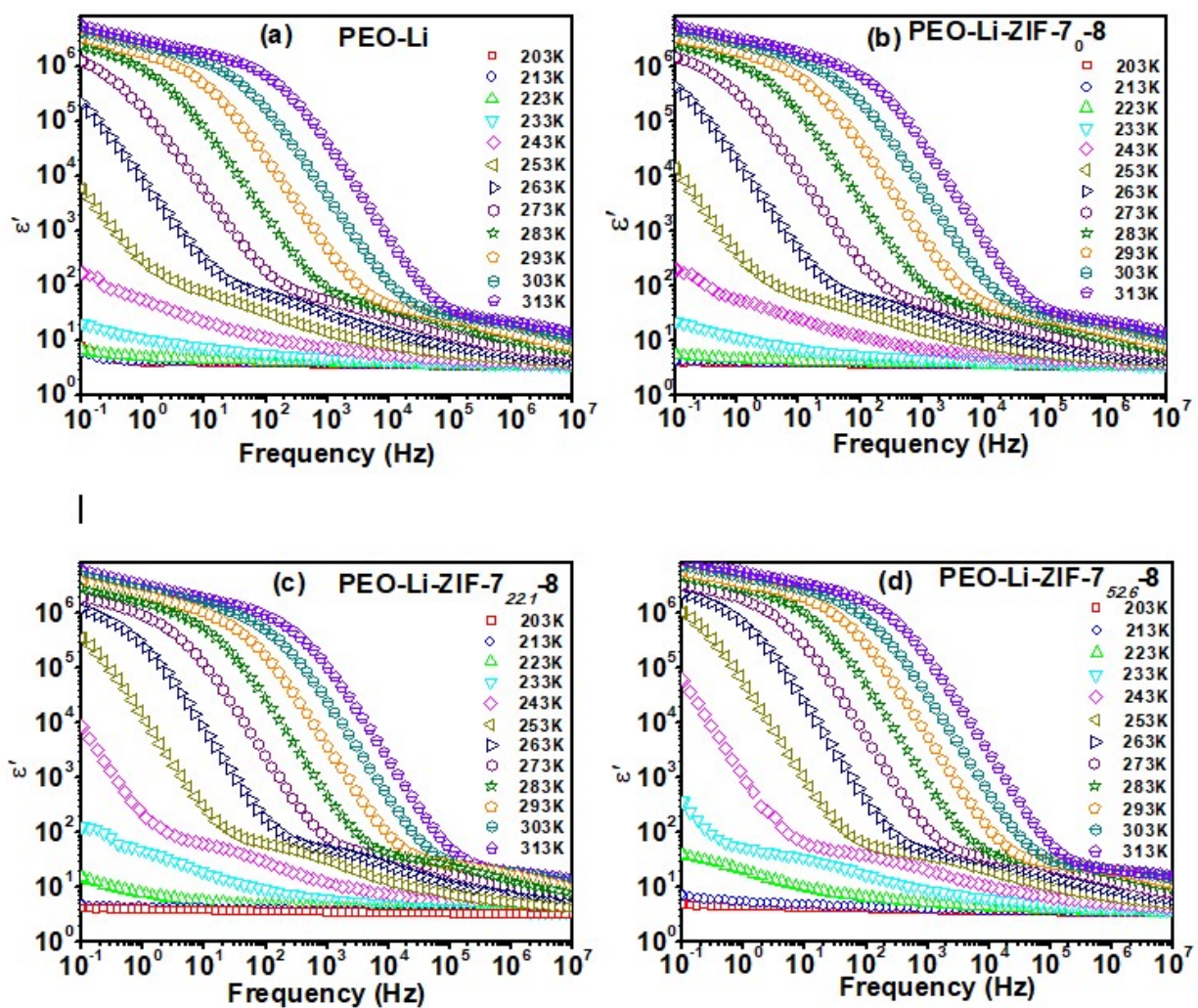
**Figure S3:** Pore sizes corresponding to aperture ( $d_{sp}$ ) and cavity ( $d_{lp}$ ) of the mixed ligand frameworks determined using PALS. The details can be found elsewhere [S1].



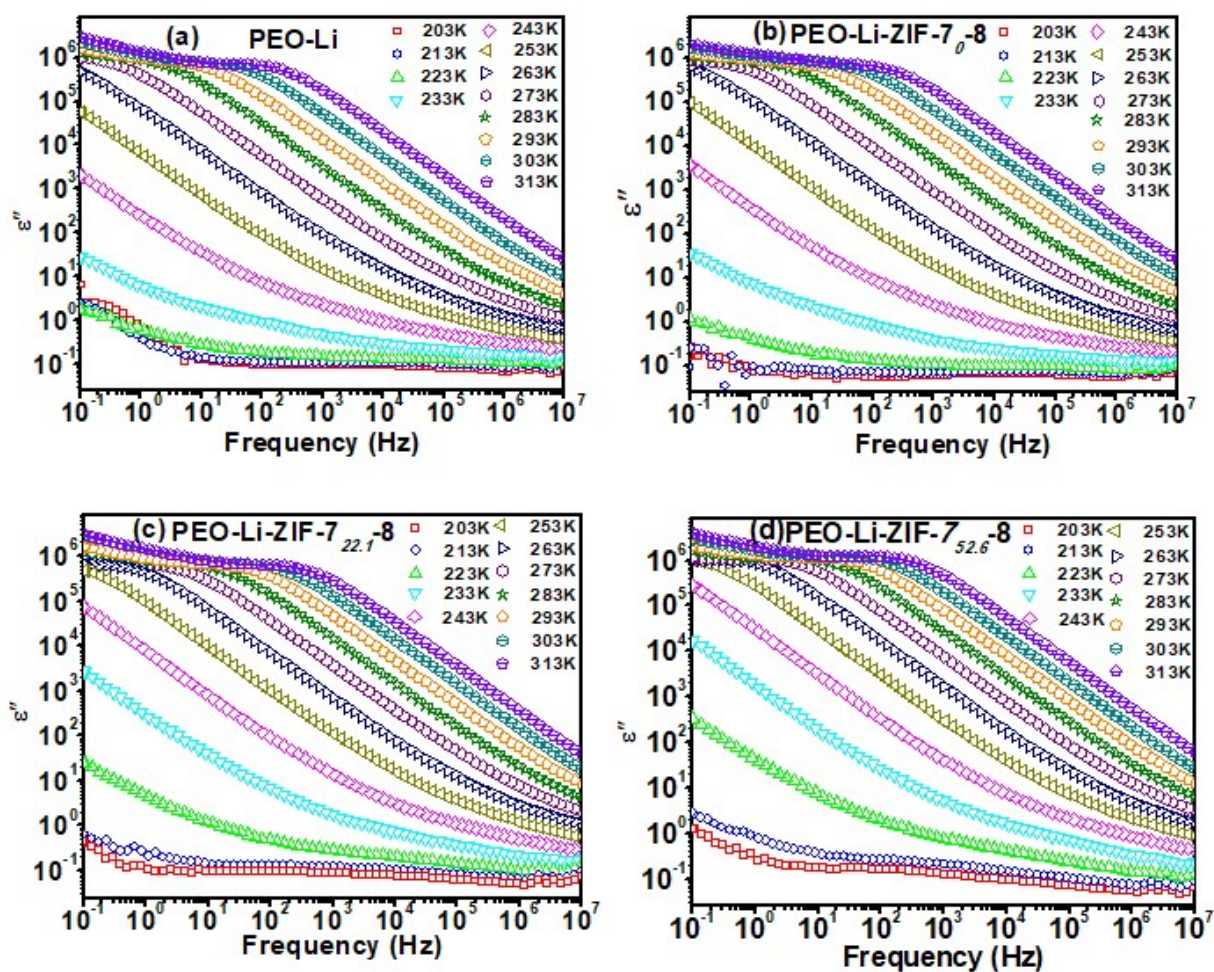
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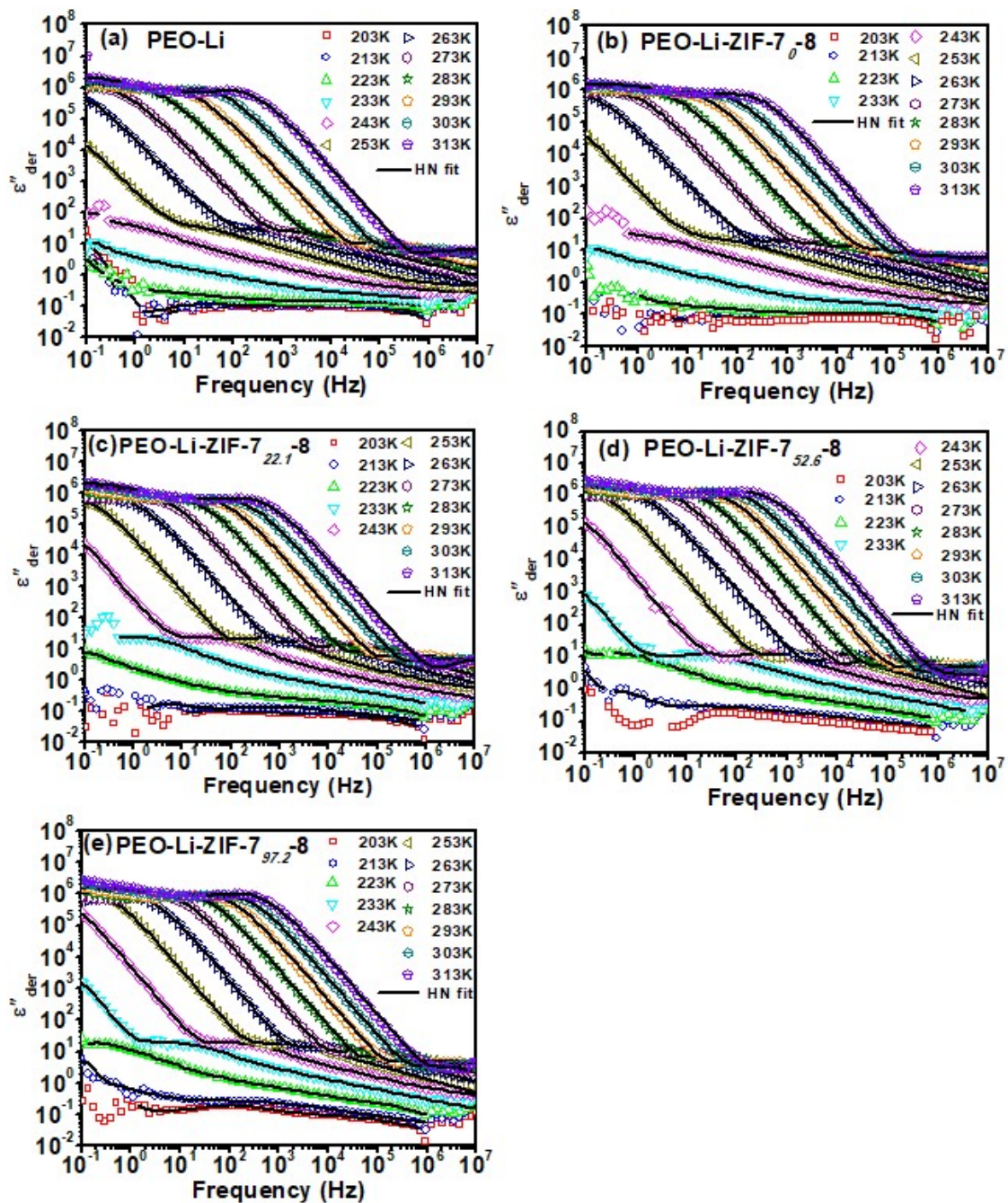
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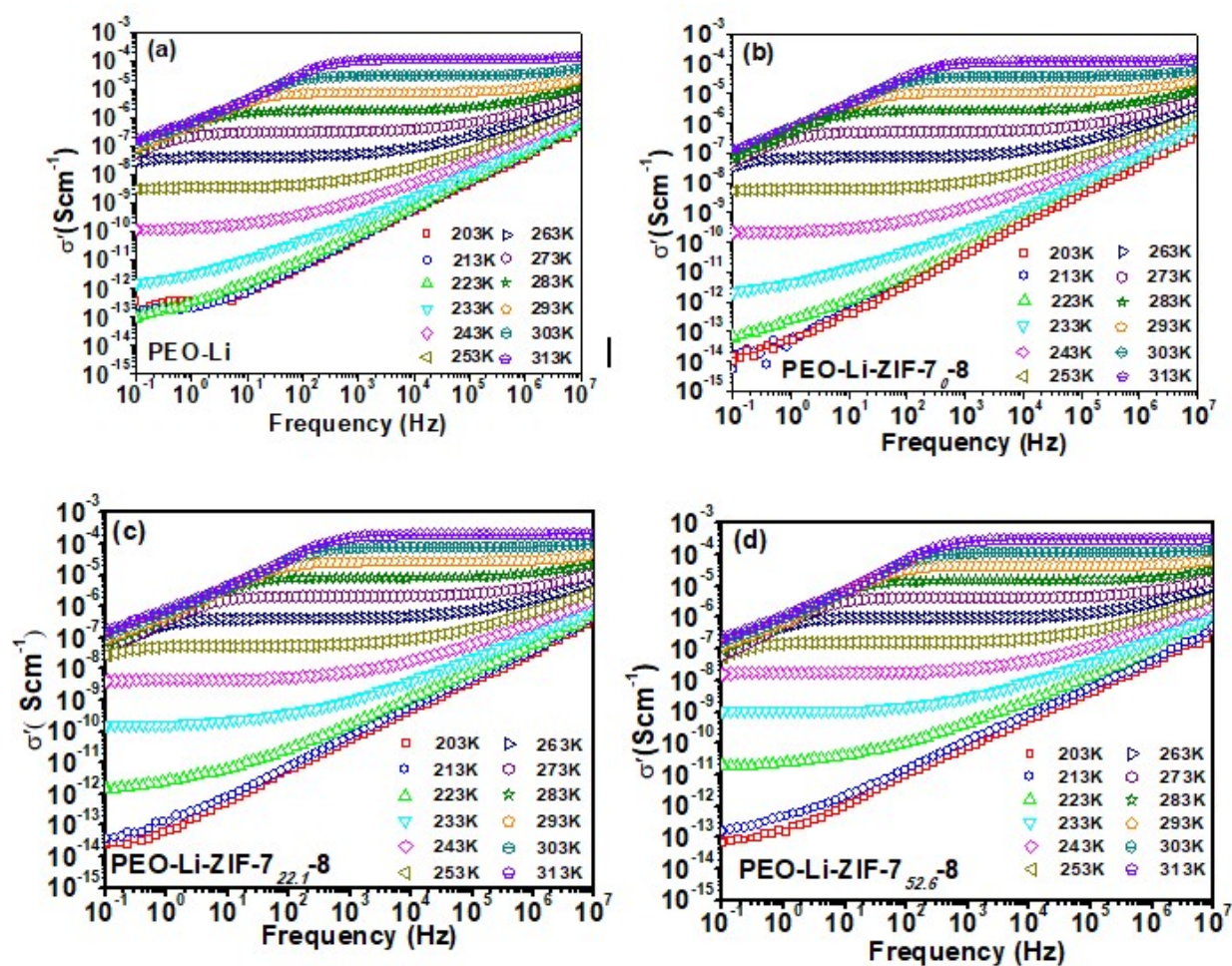


**Figure S7.** Imaginary part ( $\epsilon''$ ) of the complex permittivity for (a) PEO-Li (b) PEO-Li-ZIF-7<sub>0</sub>-8 (c) PEO-Li-ZIF-7<sub>22.1</sub>-8 (d) PEO-Li-ZIF-7<sub>52.6</sub>-8

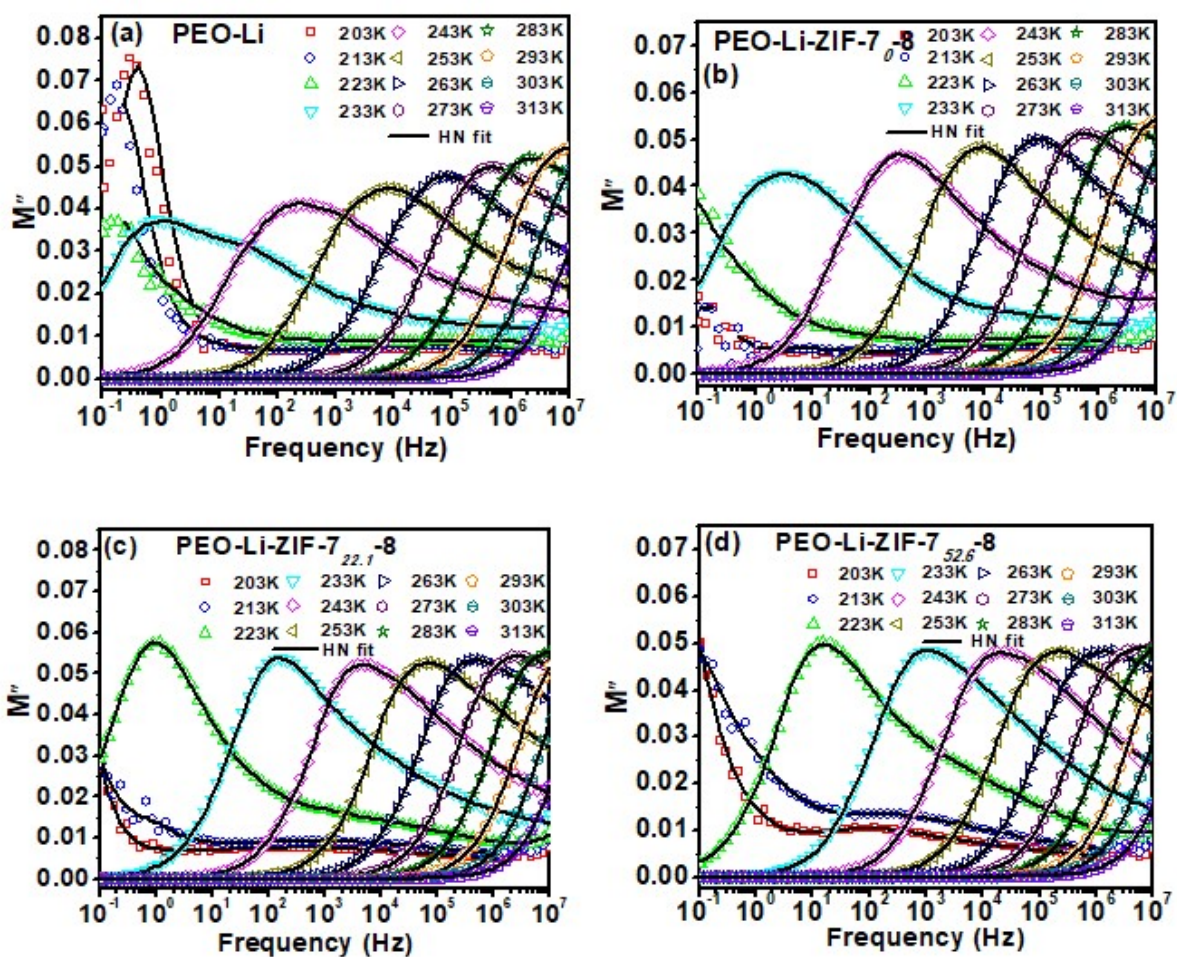


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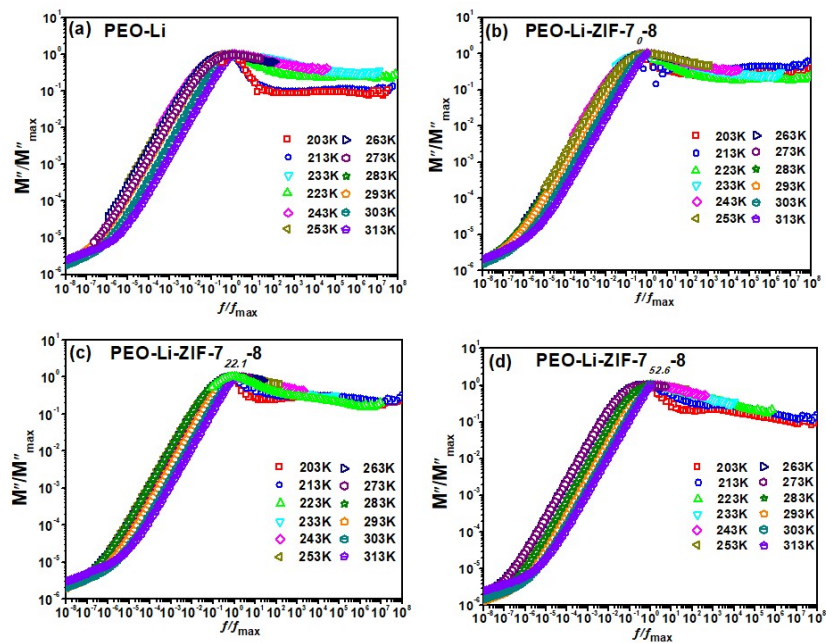




**Figure S9.** Real part ( $\sigma'$ ) of the complex conductivity for (a) PEO-Li (b) PEO-Li-ZIF-7<sub>0</sub>-8 (c) PEO-Li-ZIF-7<sub>22.1</sub>-8 (d) PEO-Li-ZIF-7<sub>52.6</sub>-8 QSSEs.



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