

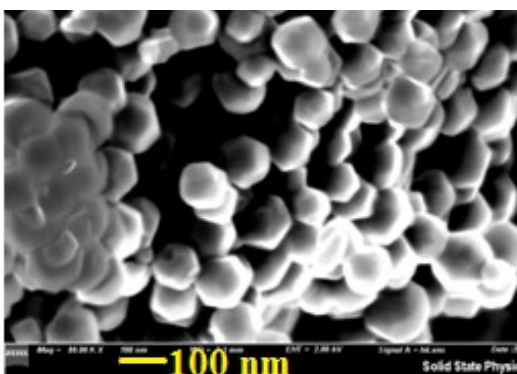
## High Ionic Conductivity and Ion Conduction Mechanism in ZIF-8 Based Quasi-Solid-State Electrolytes: a Positron Annihilation and Broadband Dielectric Spectroscopy Study

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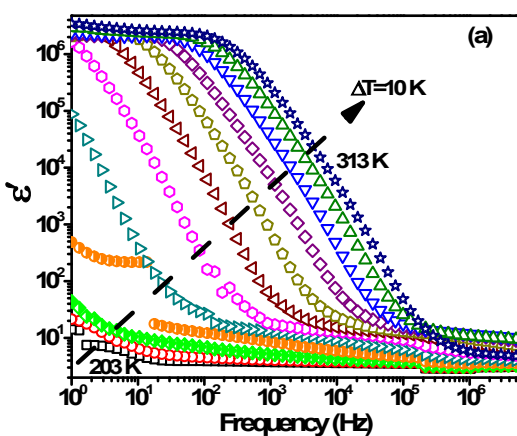
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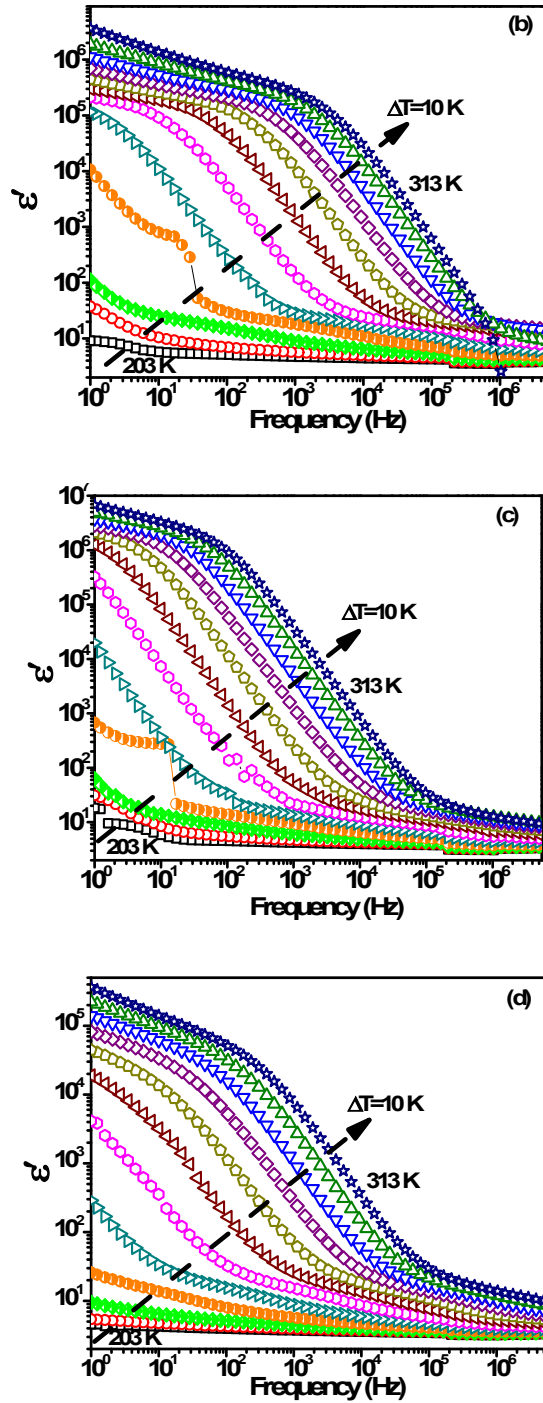
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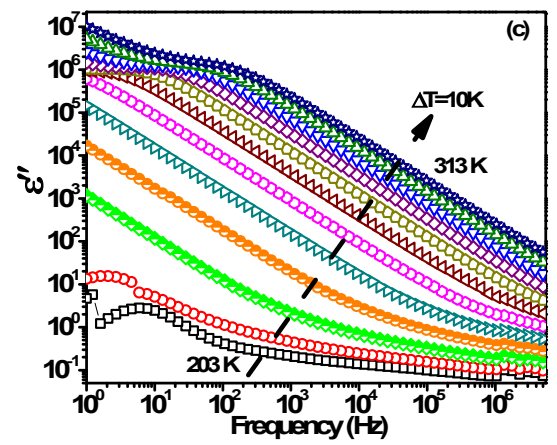
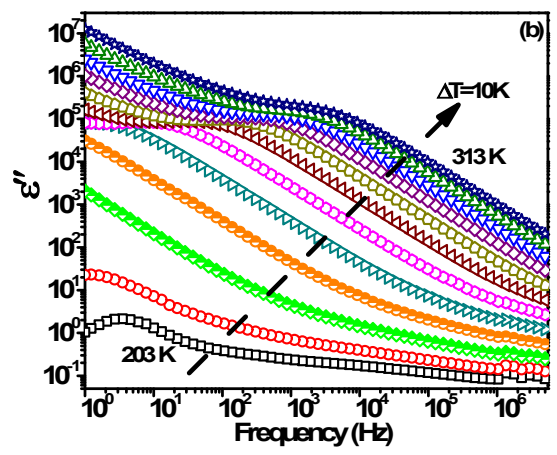
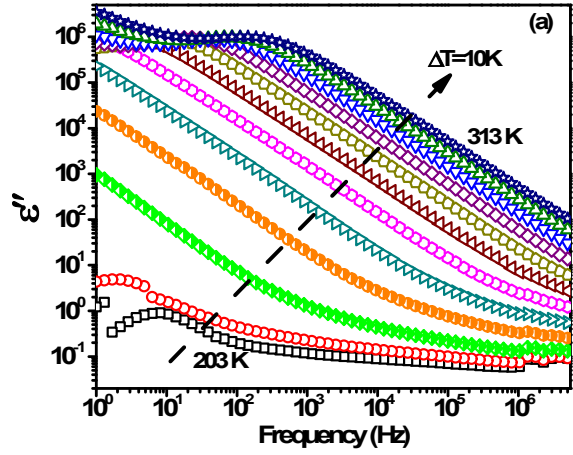


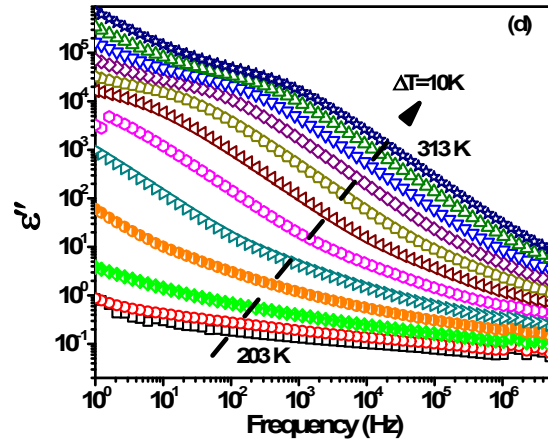
**Figure S1.** SEM image of the synthesized ZIF-8 nanoparticles; scale bar at the bottom denotes 100 nm.



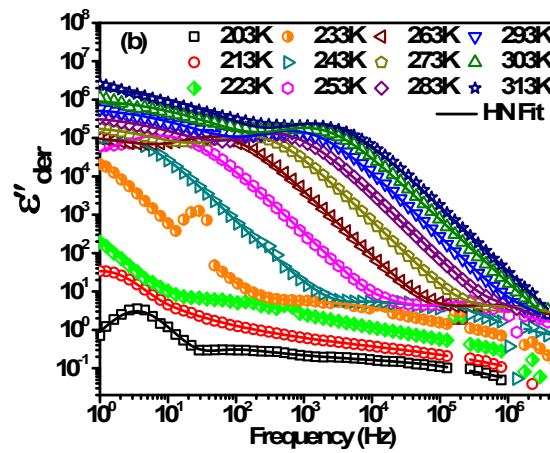
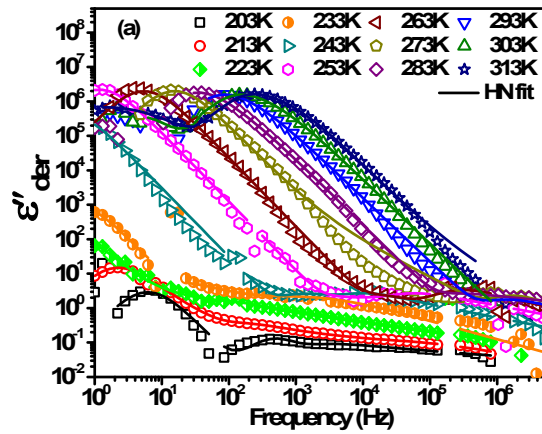


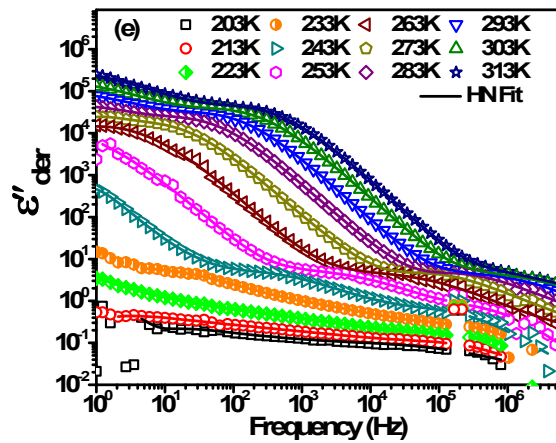
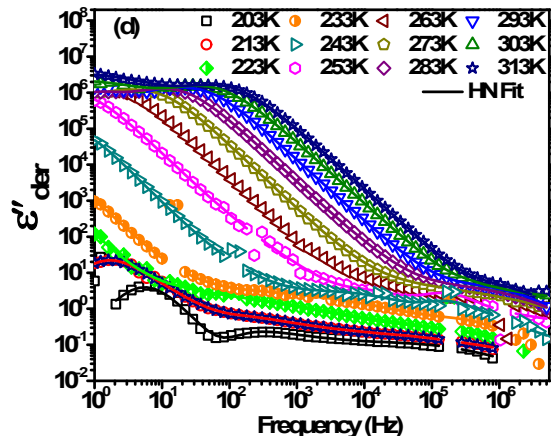
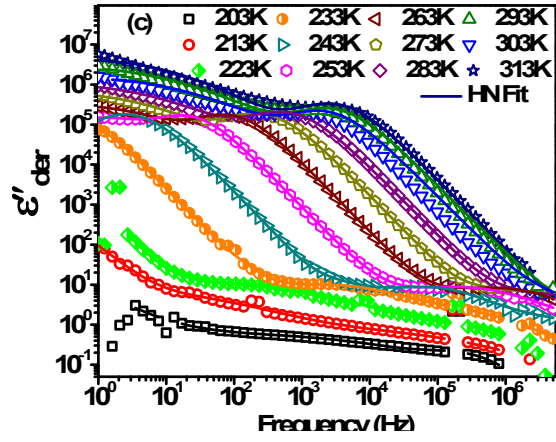
**Figure S2.** Real part ( $\epsilon'$ ) of the complex permittivity for (a) Z-0 (b) Z-10 (c) Z-50 (d) Z-70 QSSEs.



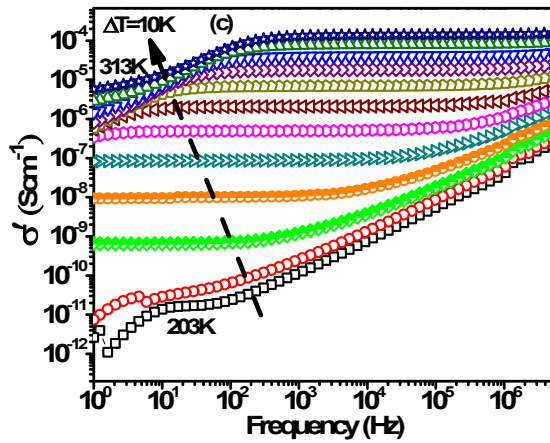
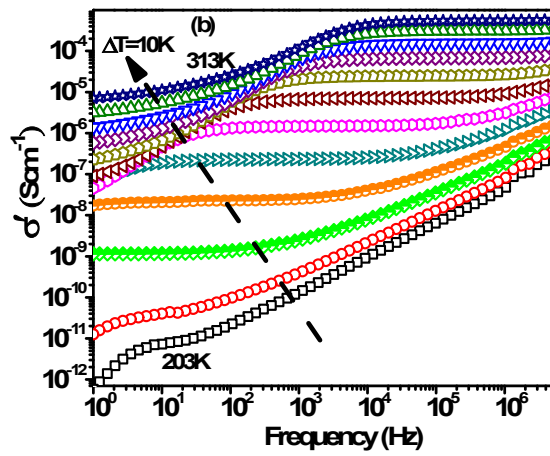
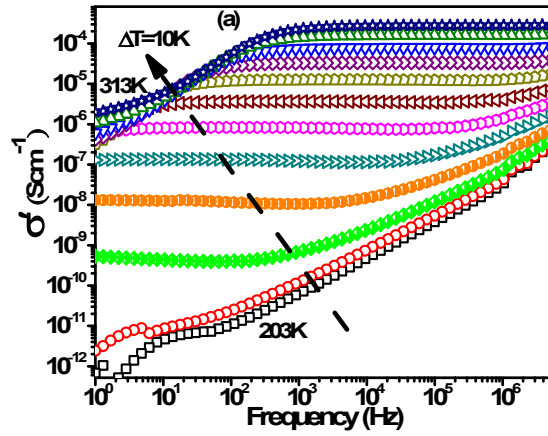


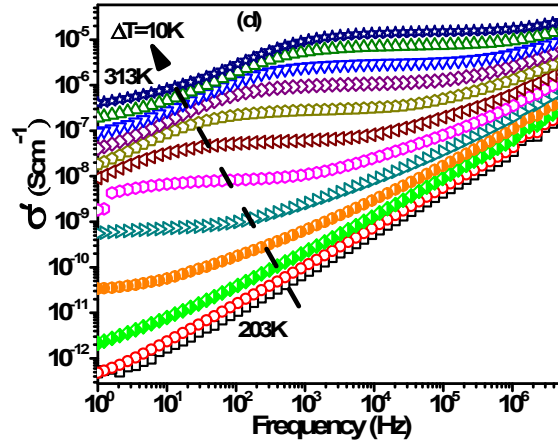
**Figure S3.** Imaginary part ( $\epsilon''$ ) of the complex permittivity for (a) Z-0 (b) Z-10 (c) Z-50 (d) Z-70 QSSEs.



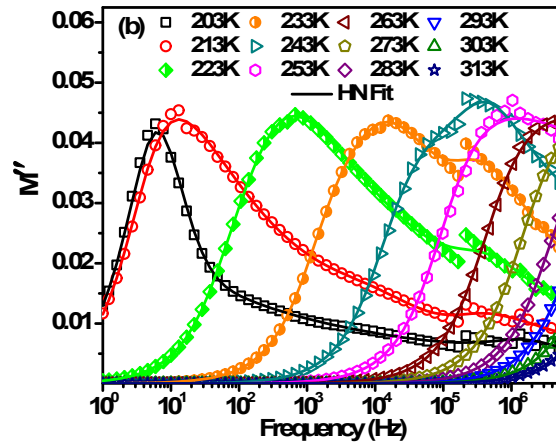
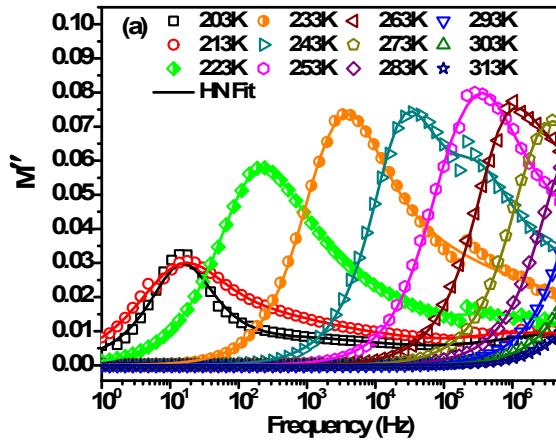


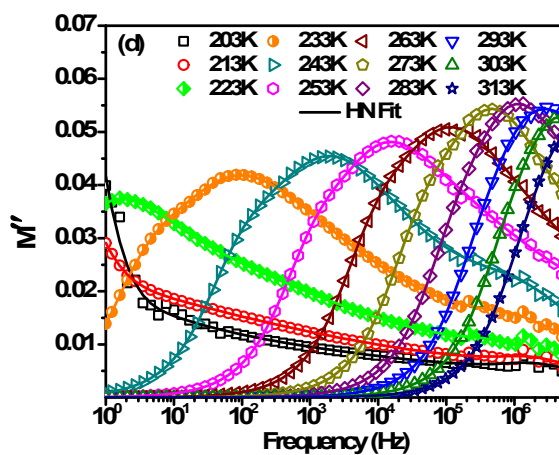
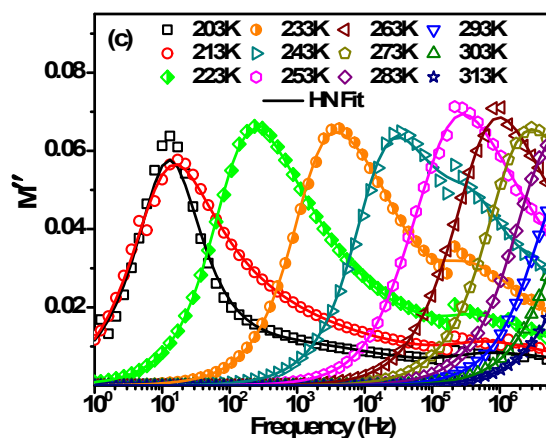
**Figure S4.** dc conduction free dielectric permittivity for (a) Z-0 (b) Z-10 (c) Z-30 (d) Z-50 (e) Z-70 QSSEs. Solid lines show the fit of experimental data using HN formalism.



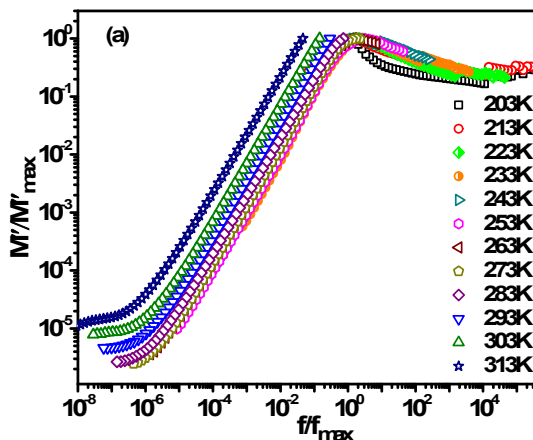


**Figure S5.** Real part ( $\sigma'$ ) of the complex conductivity for (a) Z-0 (b) Z-10 (c) Z-50 (d) Z-70 QSSEs.

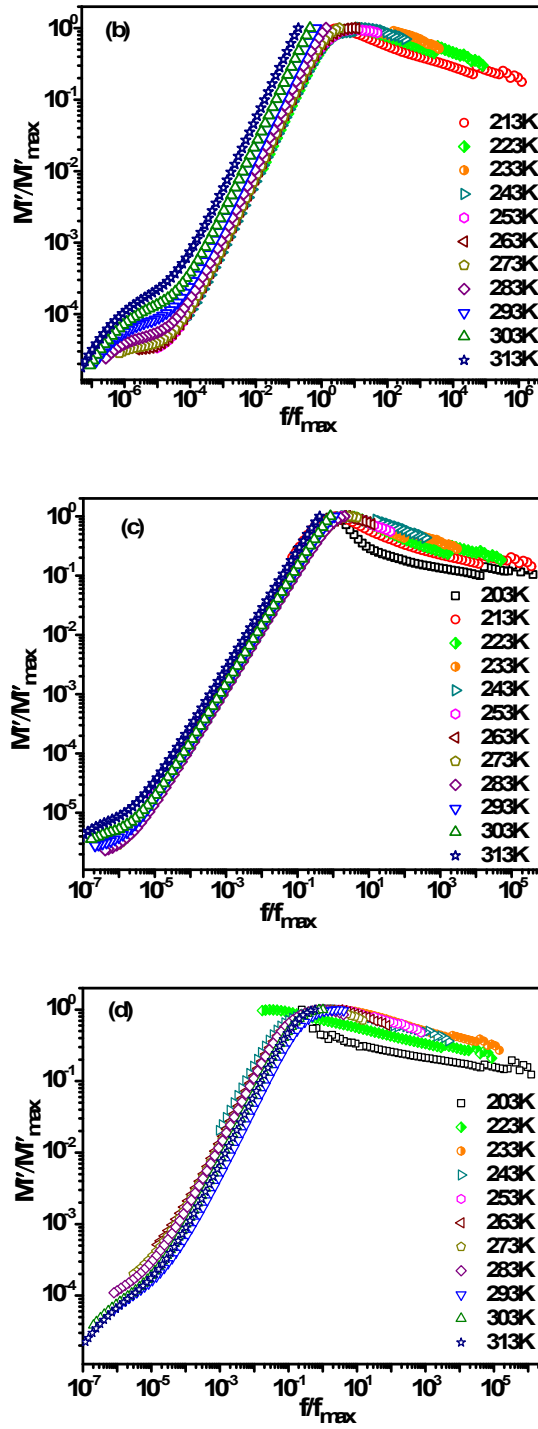




**Figure S6.** Imaginary part of modulus,  $M''$ , variation with frequency for (a) Z-0 (b) Z-10 (c) Z-50 (d) Z-70 QSSEs. Solid lines show the fit of experimental data using HN formalism.







**Figure S7.** Master curve by maxima normalization technique for (a) Z-0 (b) Z-10 (c) Z-50 (d) Z-70 QSSes.

**Table S1:** *o*-Ps annihilation parameters for ZIF-8-LiTFSI from PALS

Sample	$\tau_1$ (ns)	$I_1$ (%)	$\tau_2$ (ns)	$I_2$ (%)	$\tau_3$ (ns)	$I_3$ (%)	$\tau_4$ (ns)	$I_4$ (%)
ZIF-8-	0.19	32.48	0.49	49.10	2.41	14.33	8.34	4.09
LiTFSI	$\pm 0.01$	$\pm 1.68$	$\pm 0.01$	$\pm 1.47$	$\pm 0.07$	$\pm 0.24$	$\pm 0.33$	$\pm 0.26$