

*Electronic supplementary information (ESI)*

**Realistic Dielectric Response of High Temperature Sintered ZnO Ceramic: A Microscopic and Spectroscopic Approach**

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*Supporting Figures*

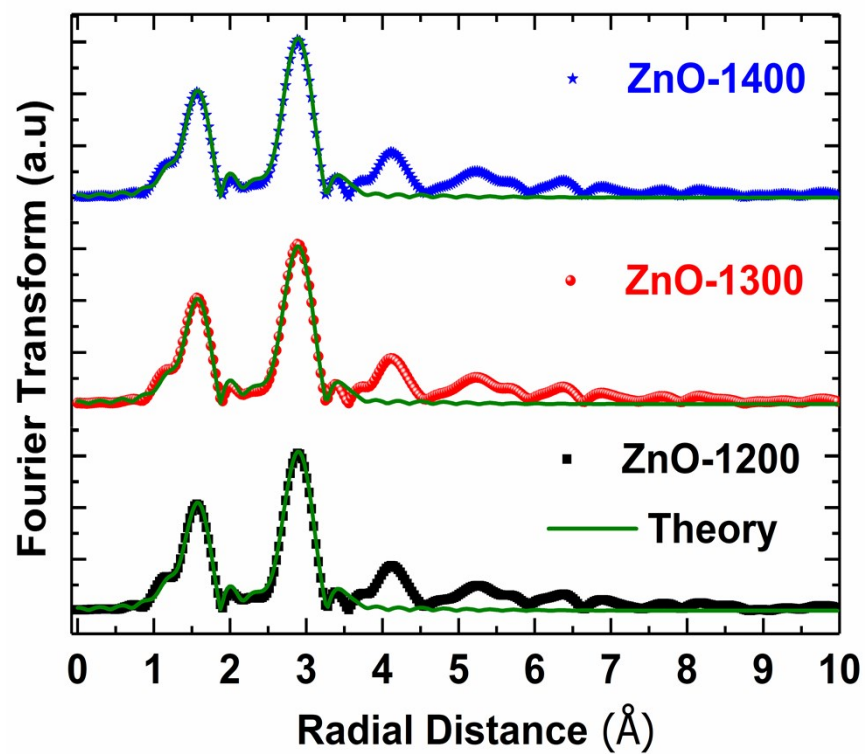


Fig. S1 Magnitude of the Fourier transform of the Zn K-edge spectra of ZnO sample sintered at different temperatures compared with theoretical model (solid lines).

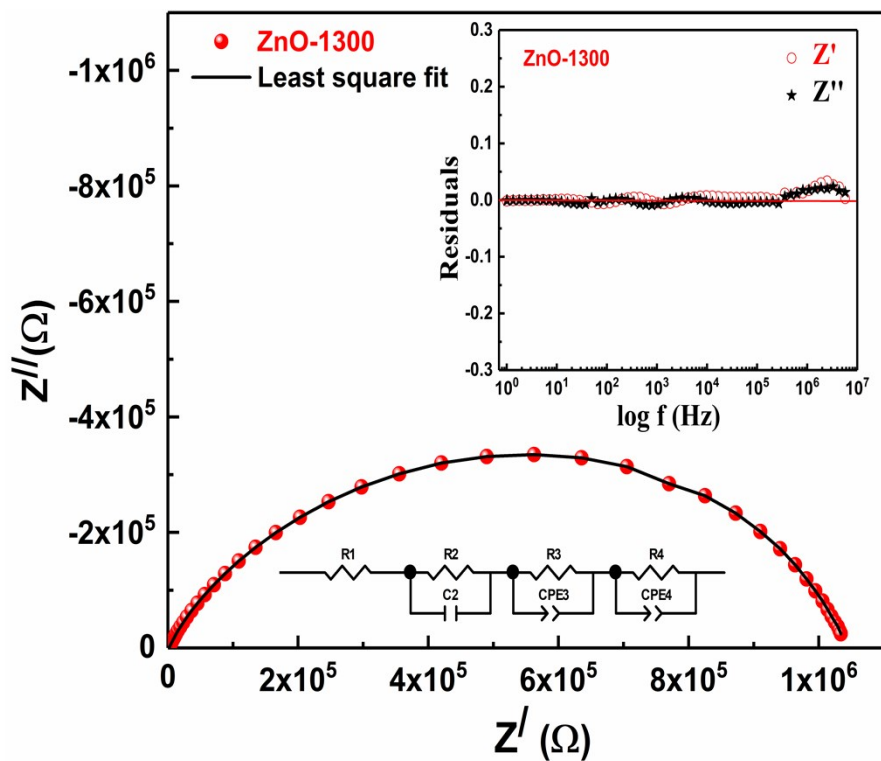


Fig. S2 Impedance plane plots ( $Z''$  vs.  $Z'$ ) of ZnO-1300 ceramic. The symbols and solid lines represent the data points and resultant fitted lines, respectively. The equivalent fitted model circuit is presented in lower insert. Upper right insert shows residuals between experimental and fitted data for the same sample.

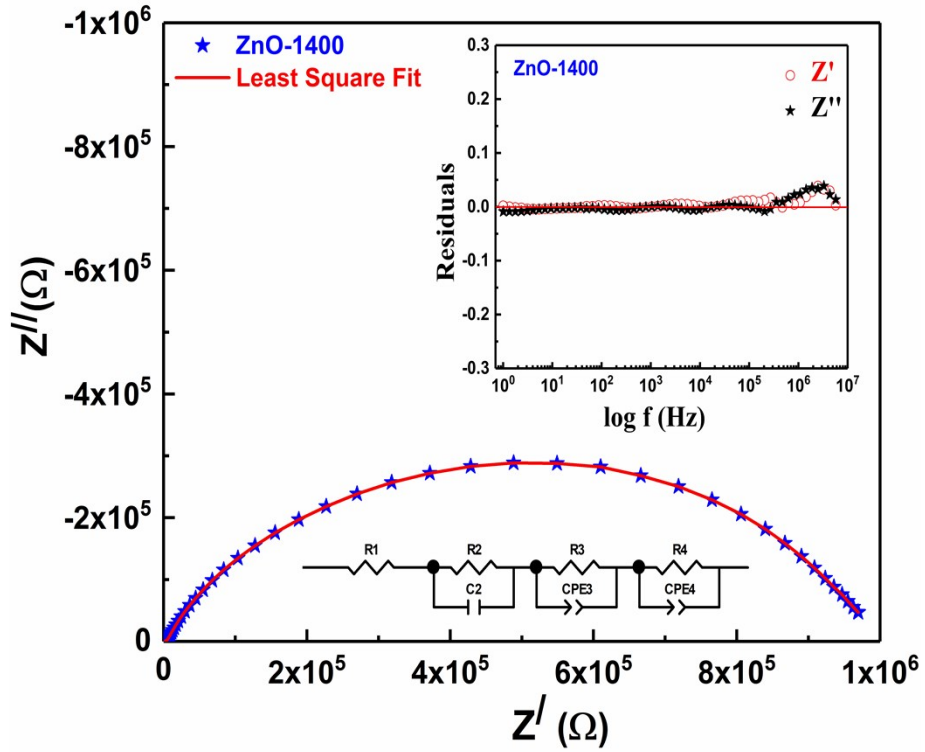


Fig. S3 Impedance plane plots ( $Z''$  vs.  $Z'$ ) of ZnO-1400 ceramic. The symbols and solid lines represent the data points and resultant fitted lines, respectively. The equivalent fitted model circuit is presented in lower insert. Upper right insert shows residuals between experimental and fitted data for the same sample.

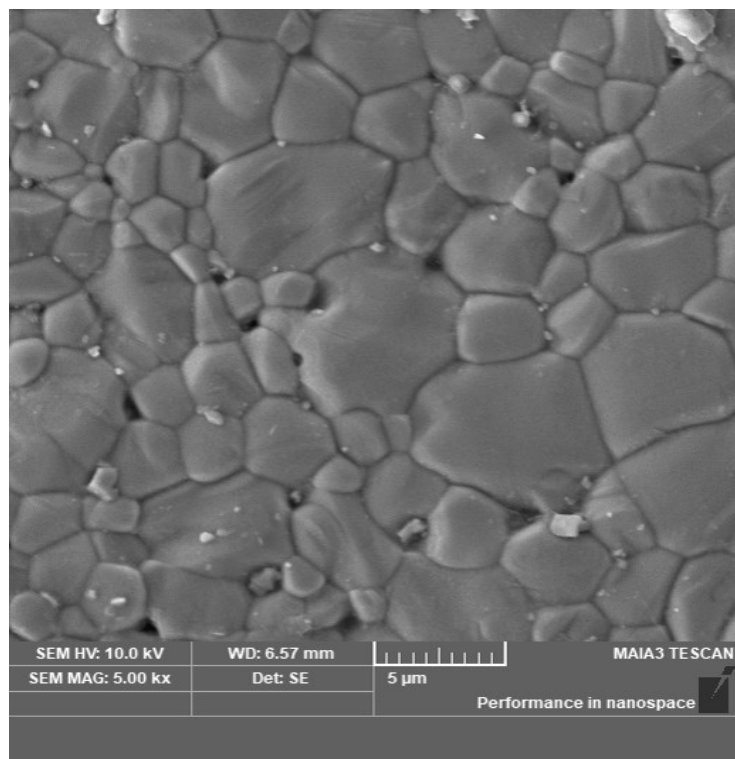


Fig. S4 High magnification SEM micrograph of ZnO-1200 ceramic.

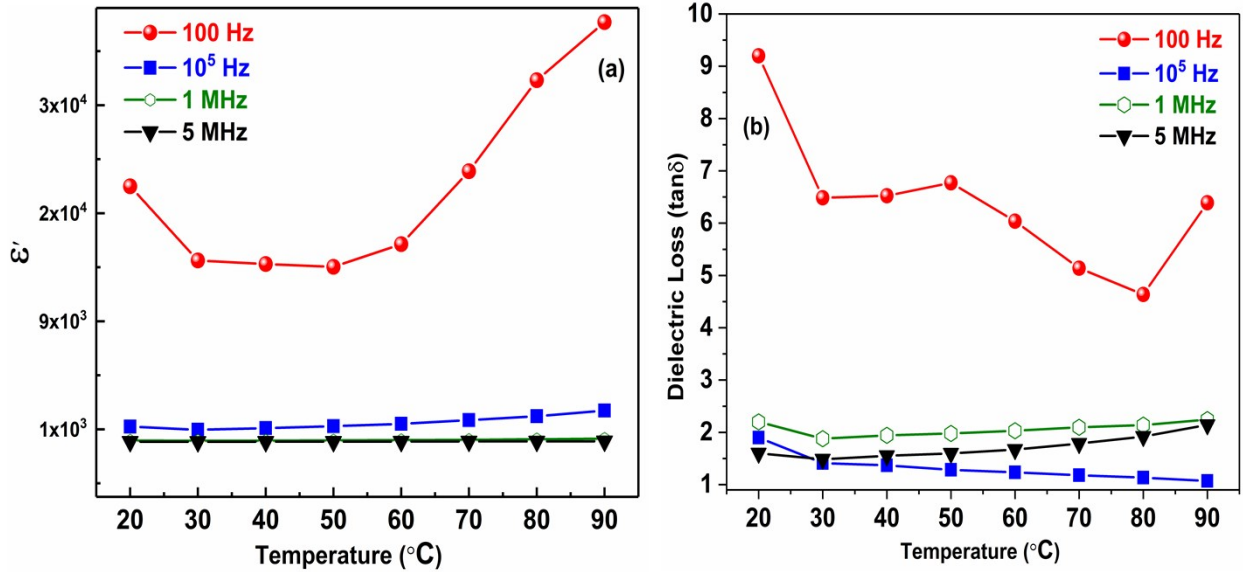


Fig. S5 (a) dielectric constant ( $\epsilon'$ ) vs. temperature and (b) dielectric loss ( $\tan\delta$ ) vs. temperature at selected frequencies for ZnO-1200 ceramic.

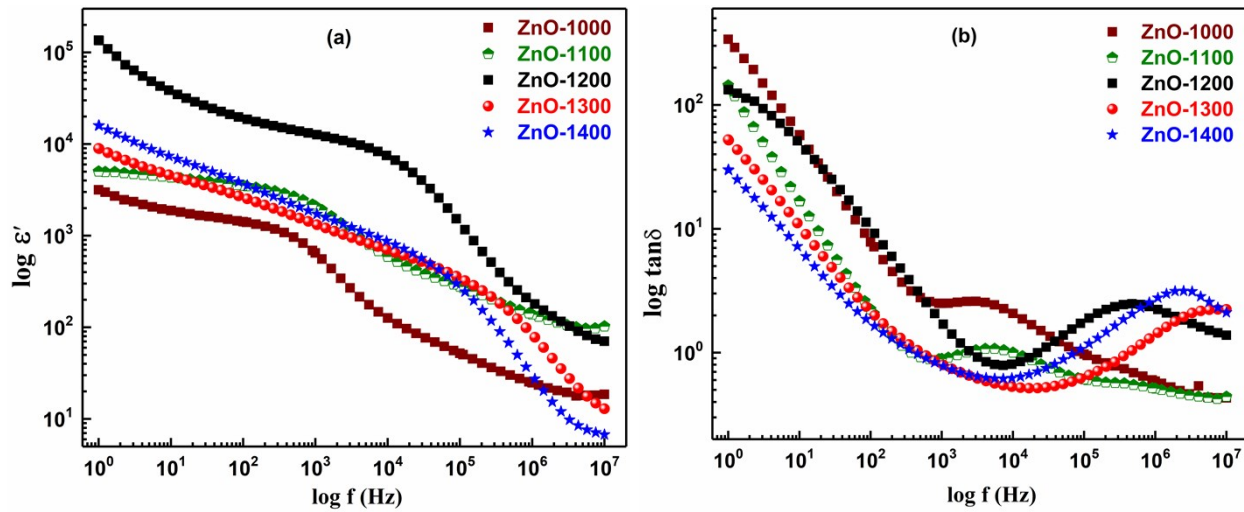


Fig. S6 Bode plots for ZnO sample sintered at 1000 $^{\circ}\text{C}$ -1400 $^{\circ}\text{C}$  in (a)  $\log \epsilon'$  vs.  $\log(f)$  and (b)  $\log \tan\delta$  vs.  $\log(f)$  formalisms.