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## **Supporting information**

## Equivalent Circuit Modeling on the Defect-dipole Enhanced Dielectric Permittivity

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**Figure S1** Frequency dependent  $\varepsilon'$  and  $\varepsilon''$  curves at room temperature. The open symbols are experimental data and the solid lines are fitted curves with the proposed equivalent circuit (ii). The results reveal the lower characteristic frequency in Li<sub>0.025</sub>In<sub>0.025</sub>Mg<sub>0.95</sub>O than in In<sub>0.025</sub>Mg<sub>0.975</sub>O. Consequently, the measured dielectric loss of Li<sub>0.025</sub>In<sub>0.025</sub>Mg<sub>0.95</sub>O is higher than that of In<sub>0.025</sub>Mg<sub>0.975</sub>O.