

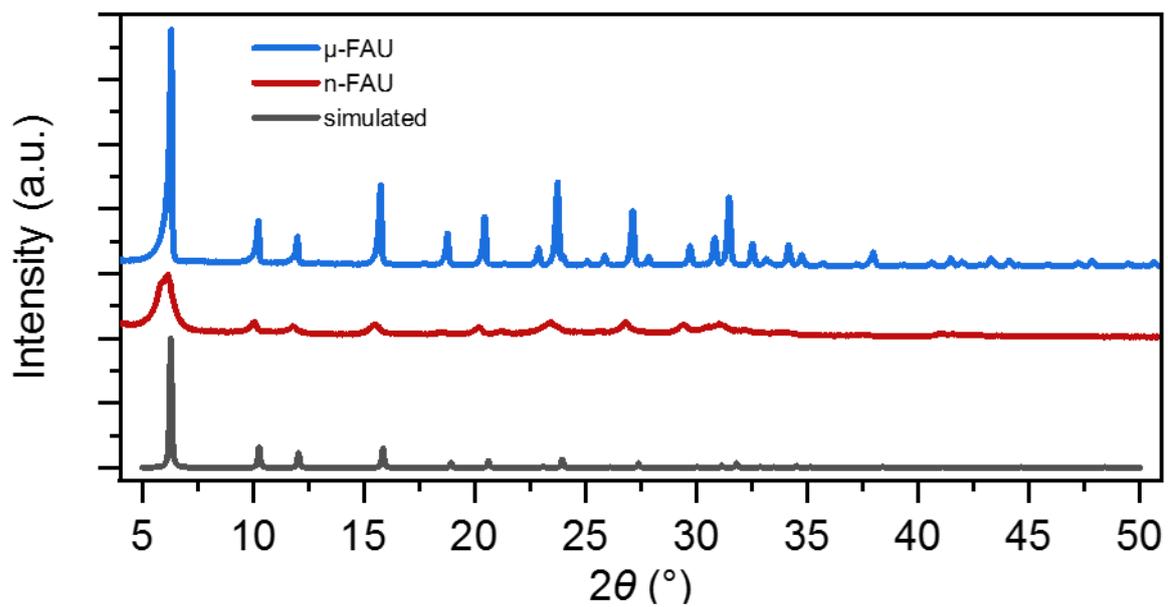
Supplementary information for

## Lattice vs. Surface Water: Correlation between the Proton Conductivity and Microstructure of Faujasite Zeolites upon Water Adsorptions

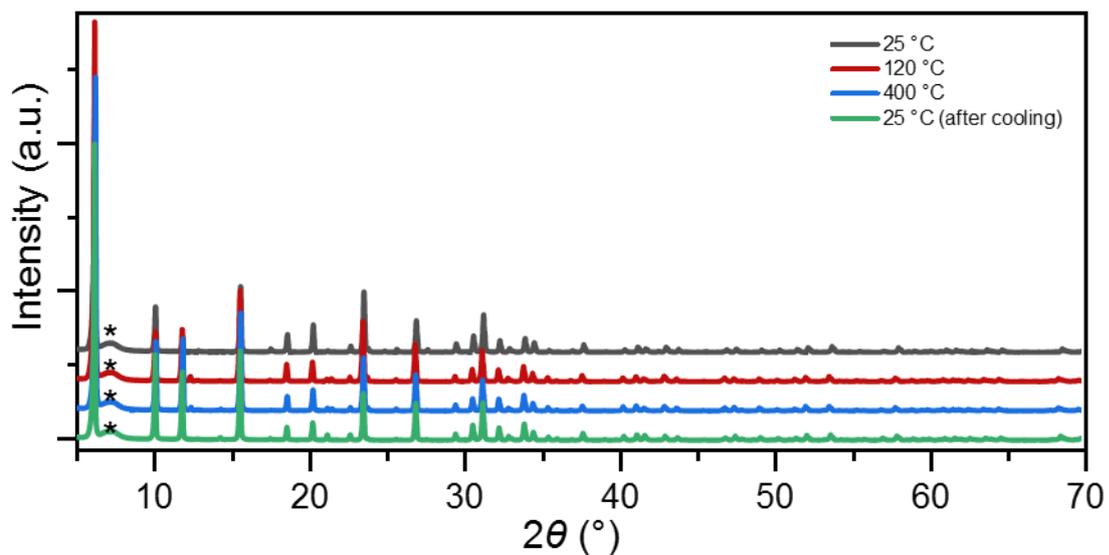
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### Contents

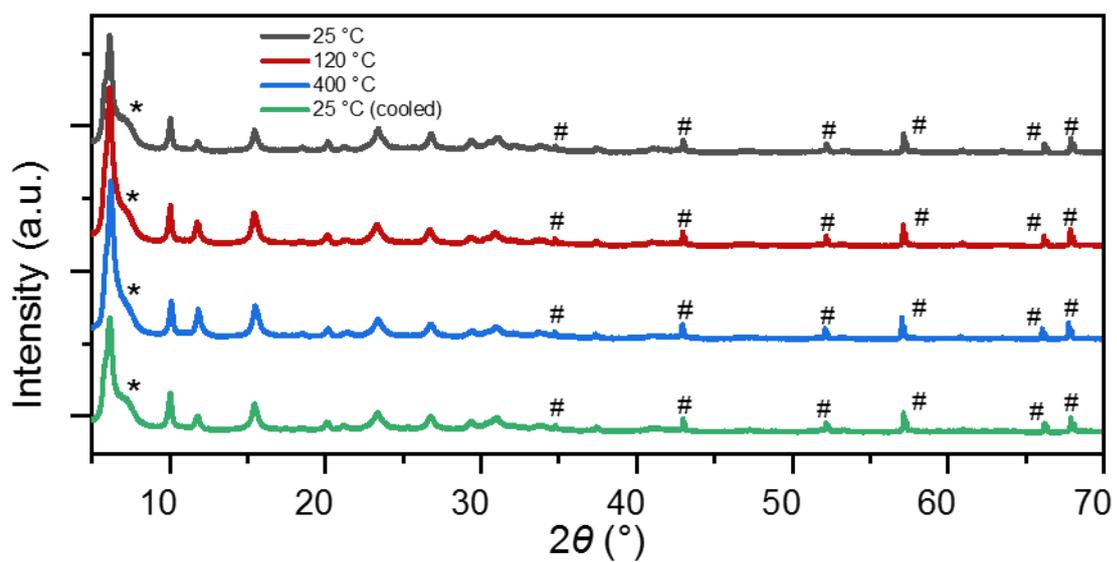
<b>Figure S1.</b> Experimental PXRD patterns of <b>μ-FAU</b> and <b>n-FAU</b> sample and pattern simulated from the crystal structure of the FAU-type zeolite. ....	2
<b>Figure S2.</b> Powder diffraction patterns of <b>μ-FAU</b> sample under non-ambient conditions. Asterisk denotes bump from the diffraction of the high-temperature camera. ....	3
<b>Figure S3.</b> Powder diffraction patterns of <b>n-FAU</b> sample under non-ambient conditions. Asterisk (*) denotes bump from the diffraction of the high-temperature camera. Diffraction of the sample holder is marked with symbol #. ....	3
<b>Figure S4.</b> TG curves (solid line) of <b>μ-FAU</b> (blue) and <b>n-FAU</b> sample (red). DTA curves (dashed line) of <b>μ-FAU</b> (blue) and <b>n-FAU</b> sample (red). ....	4
<b>Figure S5.</b> Complex impedance plane graphs measured at different temperatures for <b>μ-FAU</b> after exposure to relative humidity conditions of (a) 60%, (b) 75%, and (c) 100%. ....	5
<b>Figure S6.</b> Complex impedance plane graphs measured at different temperatures for <b>n-FAU</b> after exposure to relative humidity conditions of (a) 60%, (b) 75%, and (c) 100%. ....	6



**Figure S1.** Experimental PXR D patterns of  $\mu$ -FAU and n-FAU sample and pattern simulated from the crystal structure of the FAU-type zeolite.



**Figure S2.** Powder diffraction patterns of  $\mu$ -FAU sample under non-ambient conditions. Asterisk denotes bump from the diffraction of the high-temperature camera.



**Figure S3.** Powder diffraction patterns of n-FAU sample under non-ambient conditions. Asterisk (\*) denotes bump from the diffraction of the high-temperature camera. Diffraction of the sample holder is marked with symbol #.

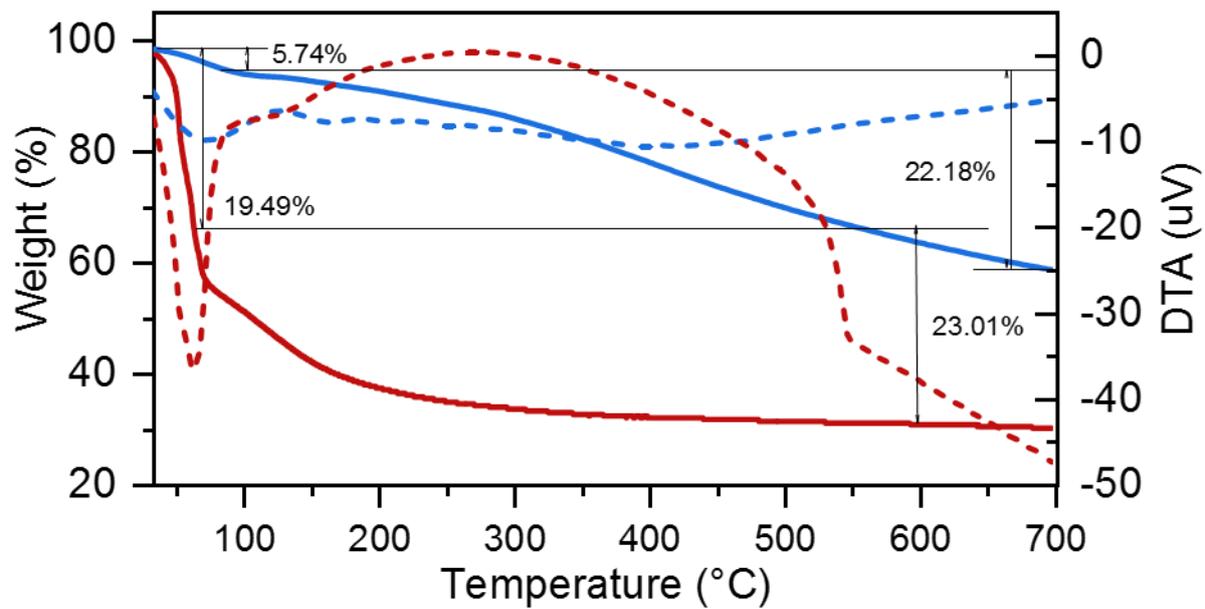


Figure S4. TG curves (solid line) of  $\mu$ -FAU (blue) and n-FAU sample (red). DTA curves (dashed line) of  $\mu$ -FAU (blue) and n-FAU sample (red).

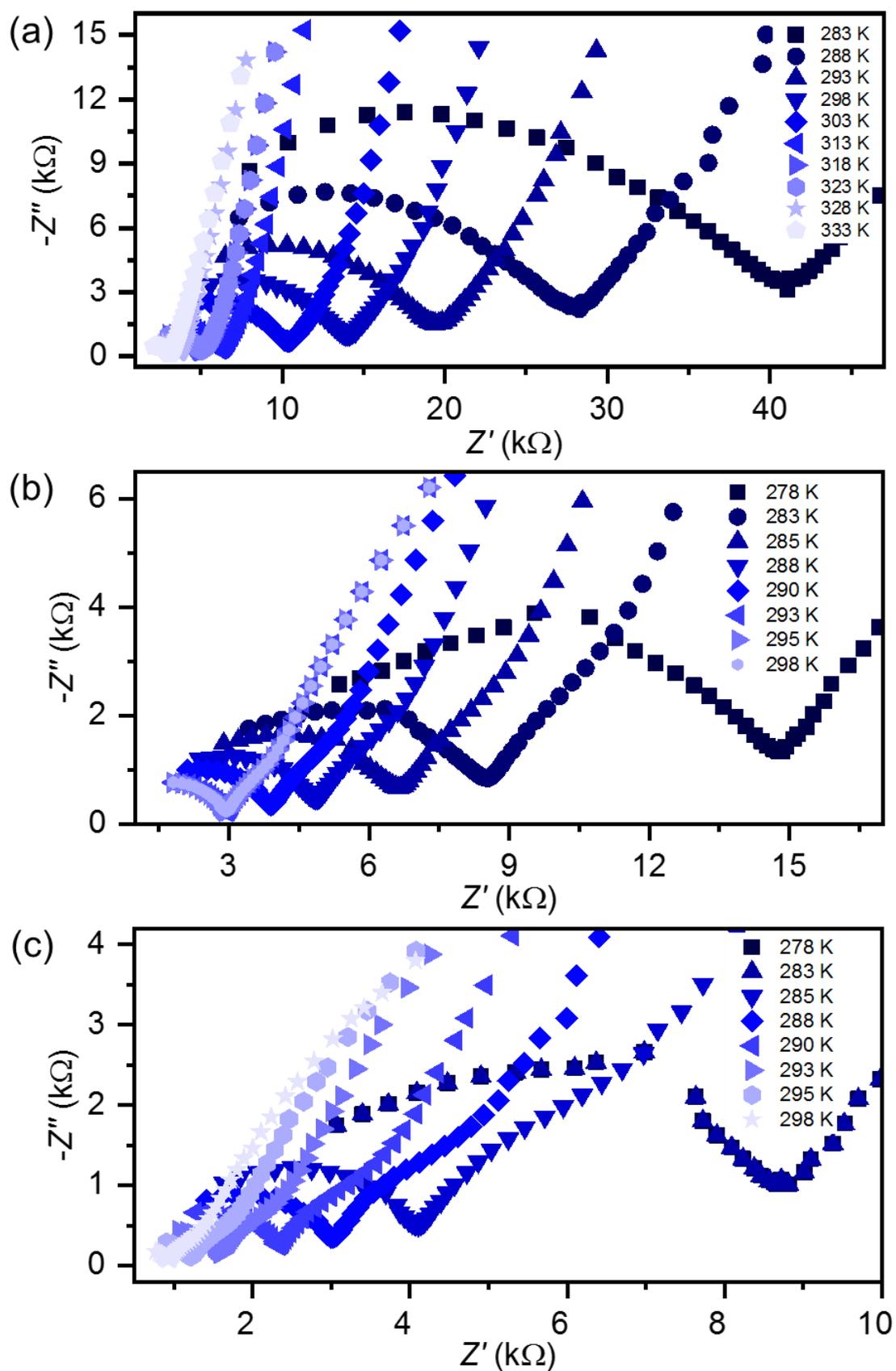


Figure S5. Complex impedance plane graphs measured at different temperatures for  $\mu$ -FAU after exposure to relative humidity conditions of (a) 60%, (b) 75%, and (c) 100%.

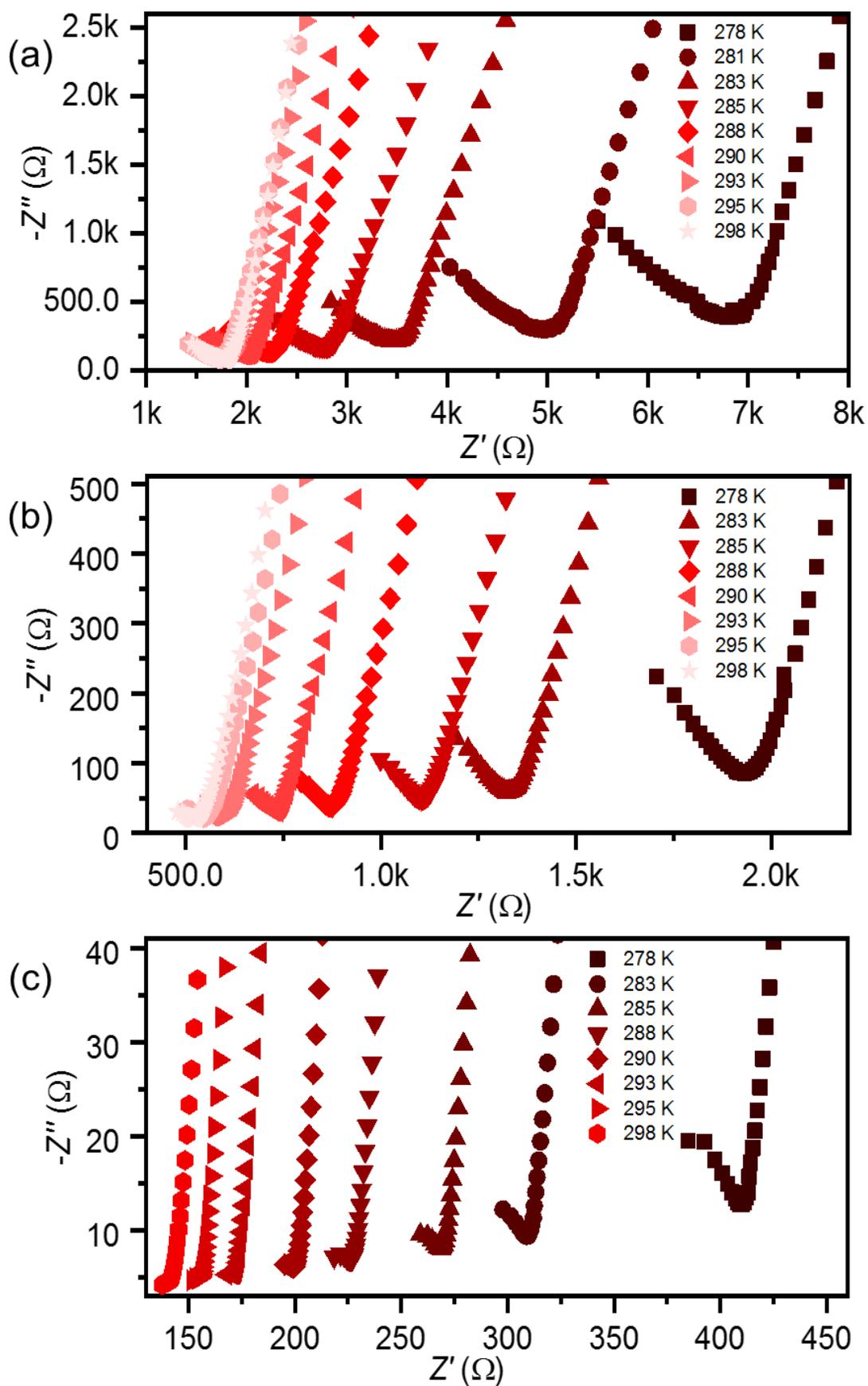


Figure S6. Complex impedance plane graphs measured at different temperatures for n-FAU after exposure to relative humidity conditions of (a) 60%, (b) 75%, and (c) 100%.