Calculating Method of Dielectric Permittivity of 8YSZ in Different Relative Humidity with Low Water Contents

Myong Nam Kong
Kim Chaek University of Technology
Nam-Chol Yu (ync781213@star-co.net.kp)
Kim Chaek University of Technology https://orcid.org/0000-0003-2323-8188
Jin Sim Kim
Kim Chaek University of Technology
Kwang Jun Kim
Kim Chaek University of Technology

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Abstract

An improved approach for calculating the dielectric permittivity of 8 mol% yttria-stabilized zirconia (8YSZ) in different relative humidity corresponding to low water contents is proposed. For this, a new virtual pore constituted by air and water is proposed using the microstructural modeling. 8YSZ material is assumed to be made up of 8YSZ solid and virtual pore. The results showed that the dielectric permittivity of the virtual pore is calculated using the upper limit of the Wiener approach for low water contents, and the effective dielectric permittivity of 8YSZ material constituted by solid and virtual pore in different relative humidity using Jayannavar's expression. The proposed approach gives a better interpretation of the experimental results in different relative humidity corresponding to low water contents.

Full Text

Due to technical limitations, full-text HTML conversion of this manuscript could not be completed. However, the latest manuscript can be downloaded and accessed as a PDF.

Figures

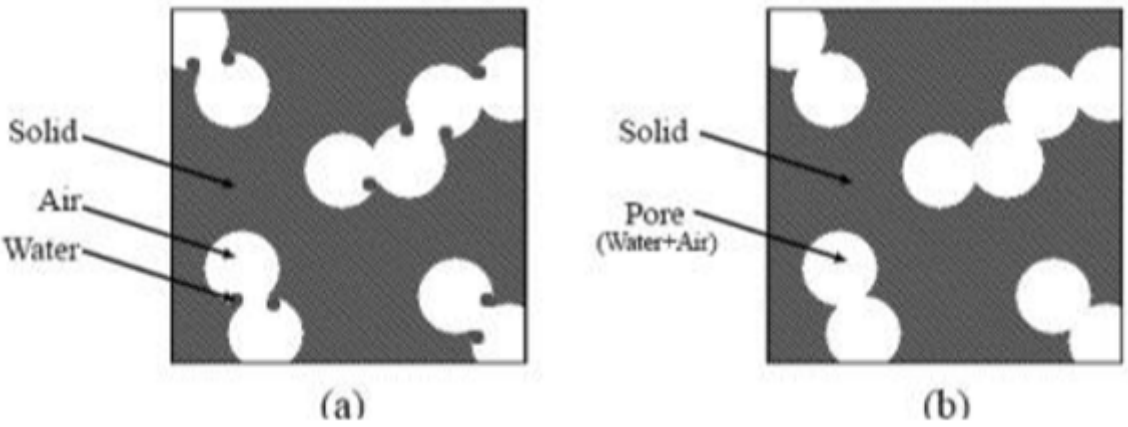

Figure 1

The equivalent microstructure corresponding to 8YSZ for low water contents

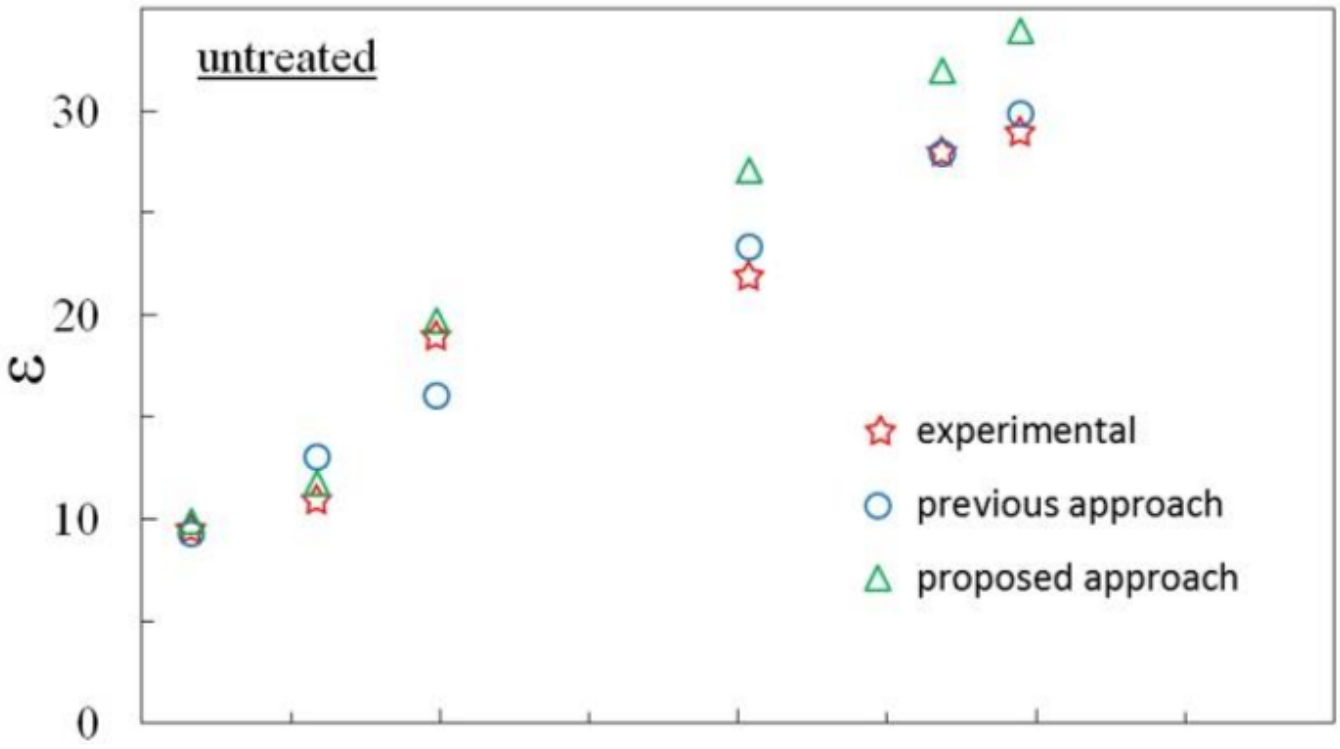

Figure 2

Water content dependence of the dielectric permittivity for sample A.

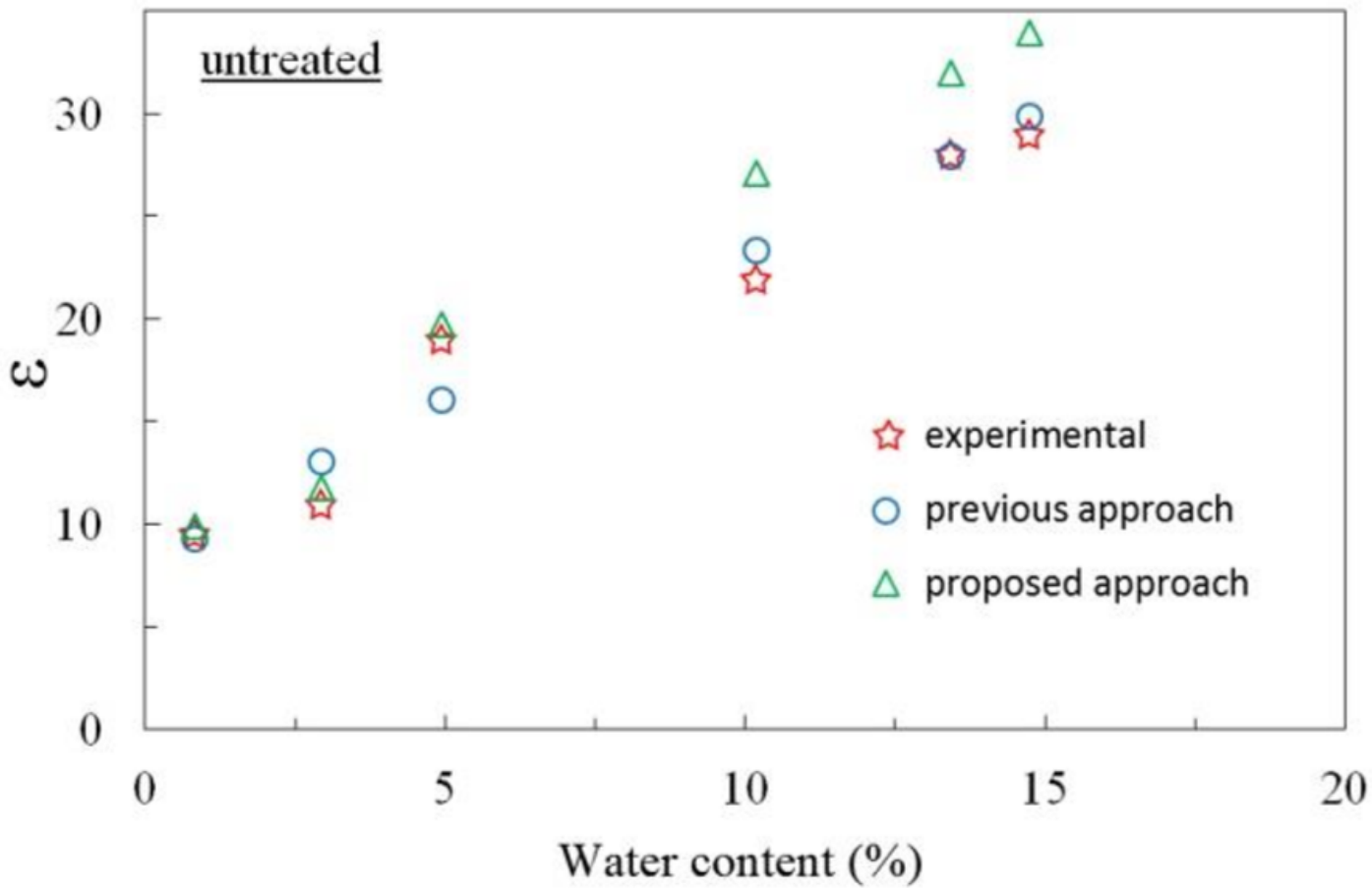

Figure 3

Water content dependence of the dielectric permittivity for sample B.

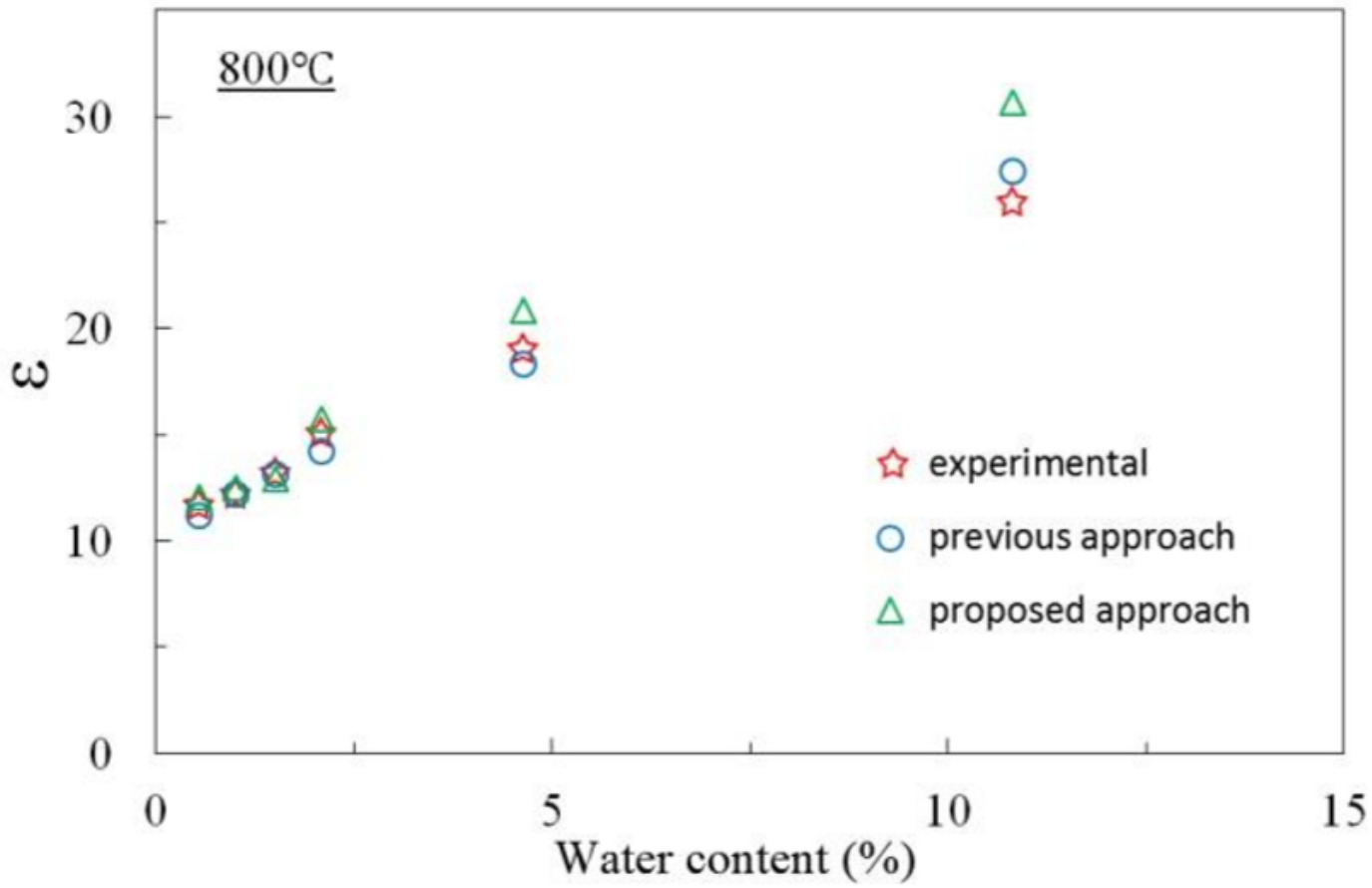

Figure 4

Water content dependence of the dielectric permittivity for sample C.

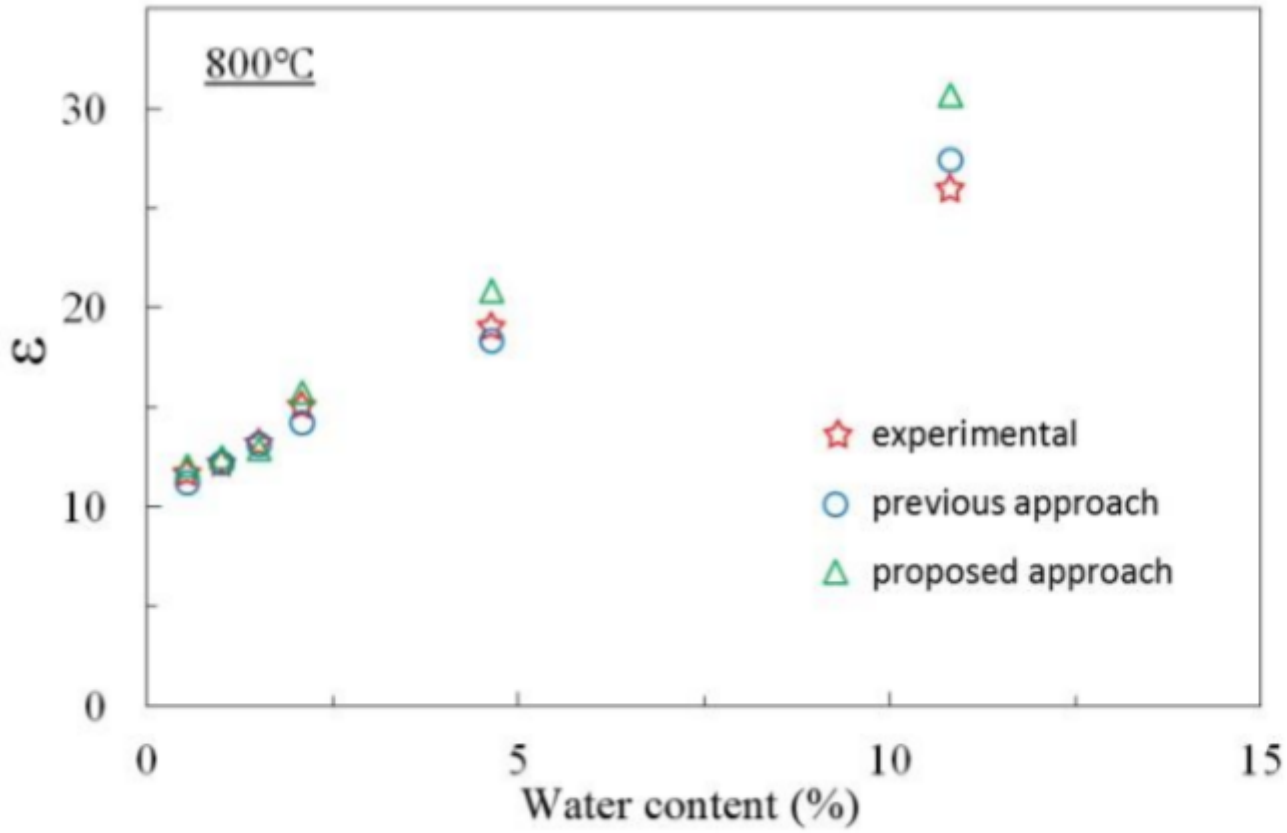

Figure 5

Water content dependence of the dielectric permittivity for sample D.