Electronic Supplementary Material (ESI) for Journal of Materials Chemistry C.

Supporting information

Stabilization and Tunable Microwave Dielectric Properties of Rutile Polymorph in α-PbO_2-Type $GaTaO_4$-Based Ceramics

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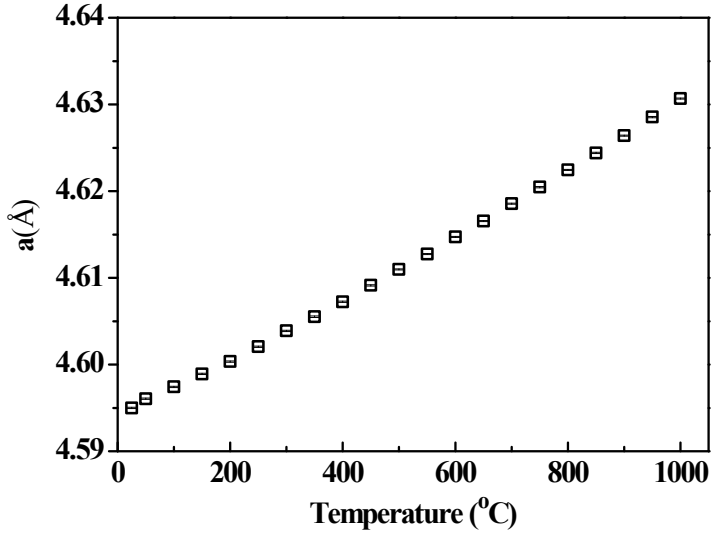
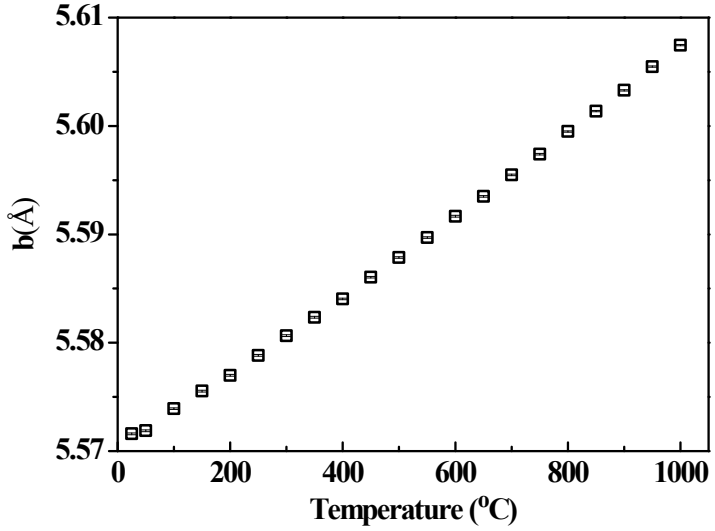
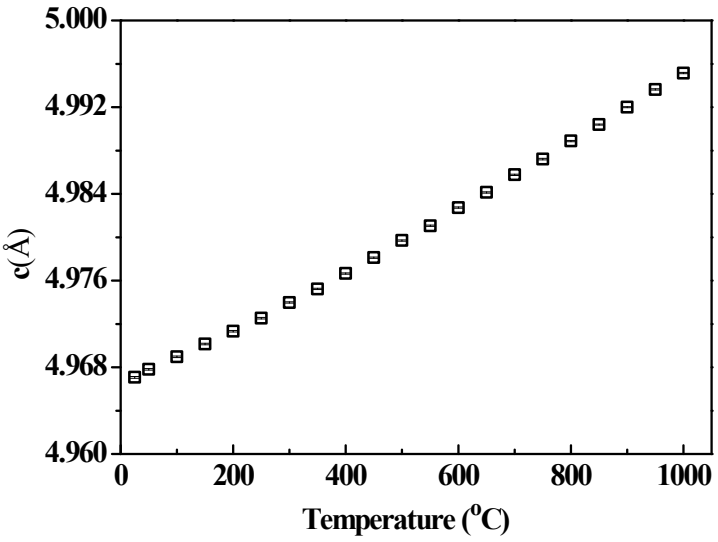
Thermal expansion of the monoclinic α-PbO_2-type $GaTaO_4$ from VT XRD data




5.61
5.60
5.59
5.58
5.57
b(Å)
0
200
400
600
800
1000
Temperature (°C)


5.000
4.992
4.984
4.976
4.968
4.960
c(Å)
0
200
400
600
800
1000
Temperature (°C)

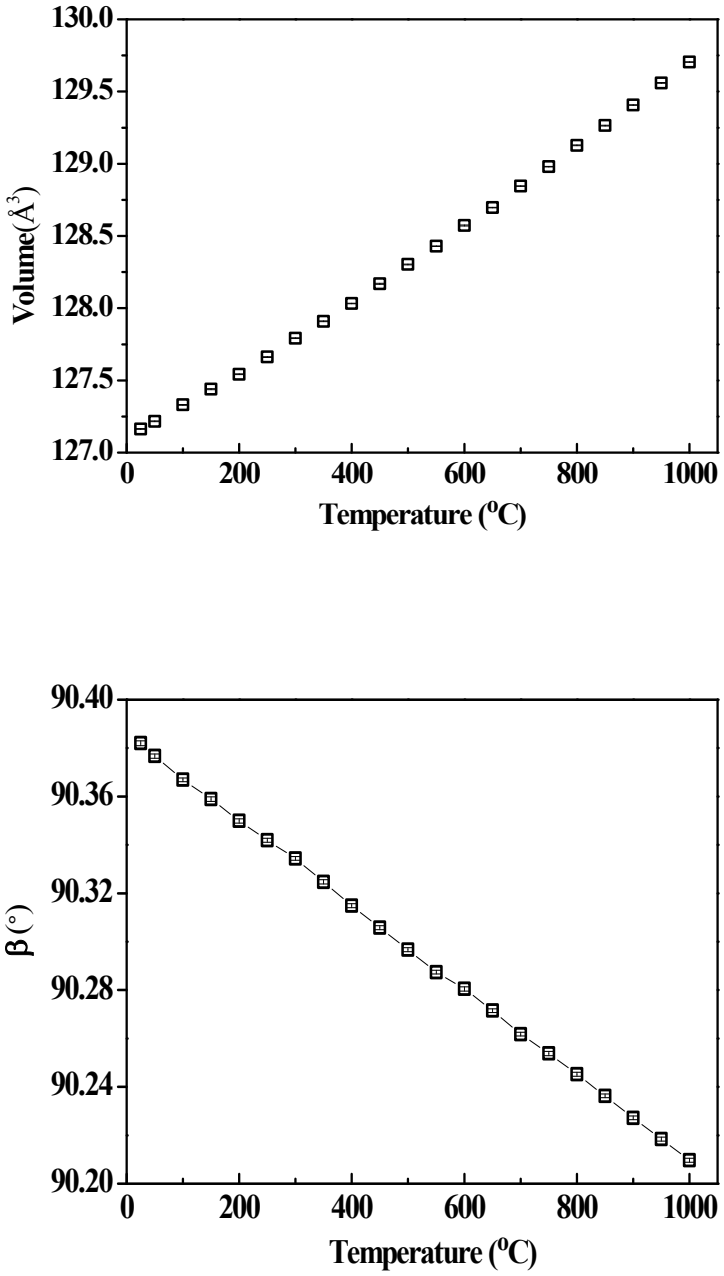


Figure S1. The refined cell parameters of monoclinic $GaTaO_4$ from room temperature to 1000 °C.

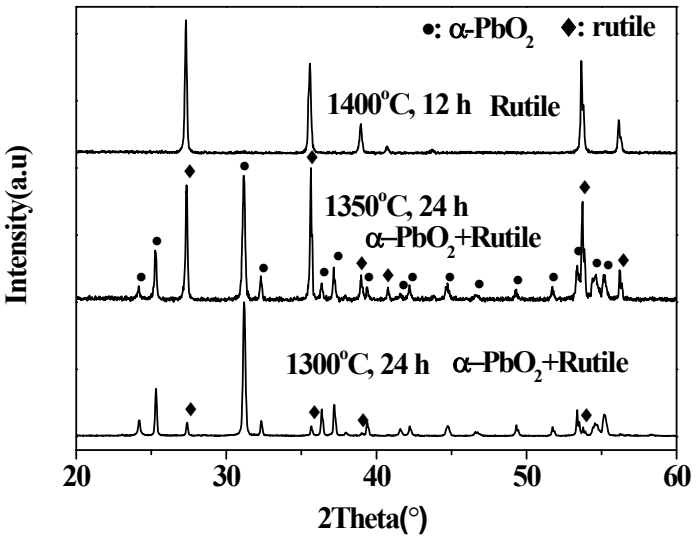


Figure S2. XRD patterns of composition x = 0.075 in $Ga_{1-x}Ta_{1-x}Ti_{2x}O_4$ fired at 1300°C, 1350°C and 1400°C.

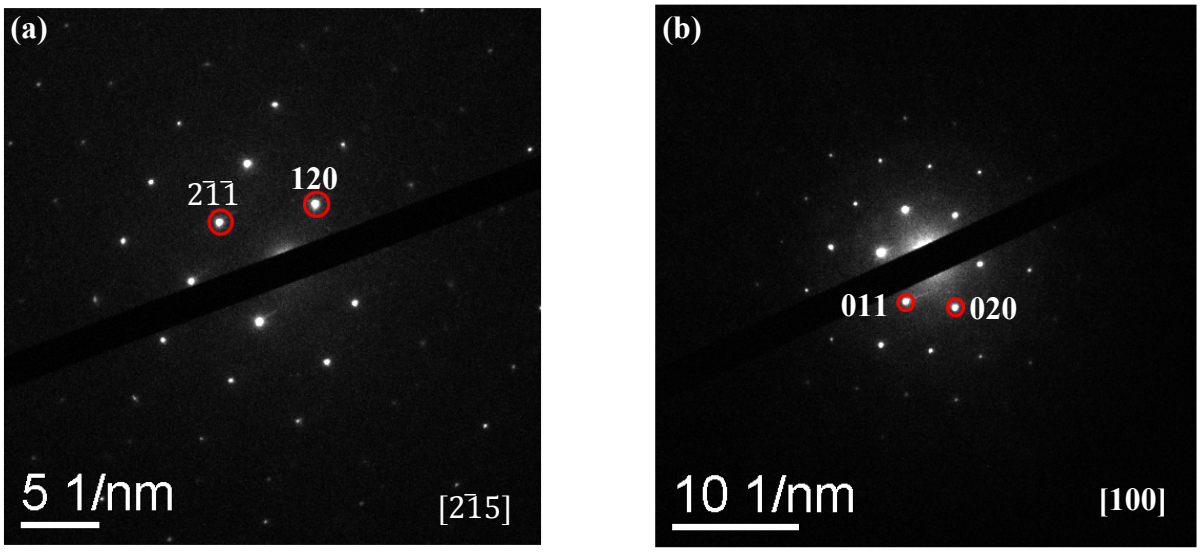


Figure S3. (a) Selected ED pattern for the α-PbO_2 phase in composition $Ga_{0.925}Ta_{0.925}Ti_{0.15}O_4$ (x = 0.075) along the $[2\bar{1}5]$ direction: the reflection condition is consistent with the monoclinic ordered P2c space group but violating the disordered Pbcn space group. (b) $[100]$ projection of the ED pattern for the rutile phase $Ga_{0.8}Ta_{0.8}Ti_{0.2}O_4$ (x = 0.2).

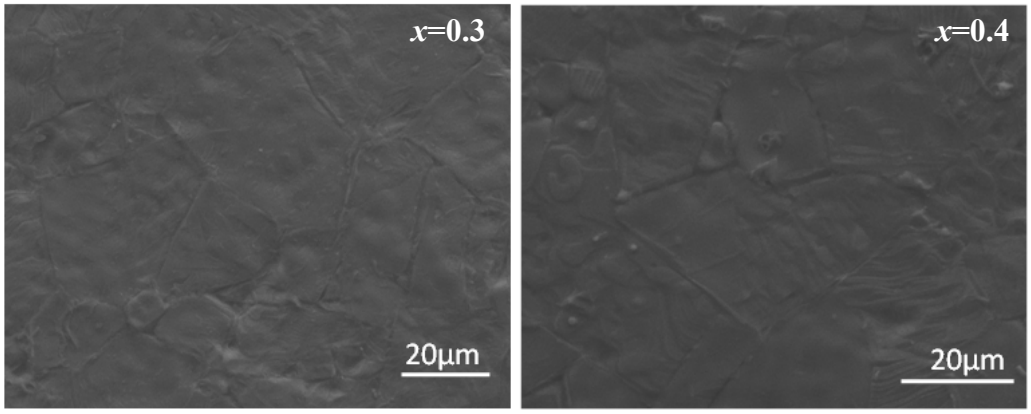


Figure S4. SEM images of surface morphology of the $Ga_{1-x}Ta_{1-x}Ti_{2x}O_4$ ceramics (x = 0.3, 0.4) fired at 1300°C.