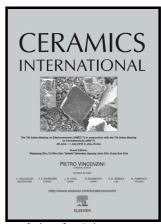
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#### **ACCEPTED MANUSCRIPT**

# Effect of Y doping on microstructure and thermophysical properties of yttria stabilized hafnia ceramics

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#### **Abstract:**

A series of  $Y_2O_3$ -doped  $HfO_2$  ceramics ( $Hf_{1-x}Y_xO_{2-0.5x}$ , x=0, 0.04, 0.08, 0.12, 0.16 and 0.2) were synthesized by solid-state reaction at 1600 °C. The microstructure, thermophysical properties and phase stability were investigated.  $Hf_{1-x}Y_xO_{2-0.5x}$  ceramics were comprised of monoclinic (M) phase and cubic (C) phase when  $Y^{3+}$  ion concentration ranged from 0.04 to 0.16. The thermal conductivity of  $Hf_{1-x}Y_xO_{2-0.5x}$  ceramic decreased as  $Y^{3+}$  ion concentration increased and  $Hf_{0.8}Y_{0.2}O_{1.9}$  ceramic revealed the lowest thermal conductivity of ~1.8 W/m\*K at 1200 °C. The average thermal expansion coefficient (TEC) of  $Hf_{1-x}Y_xO_{2-0.5x}$  between 200 °C and 1300 °C increased with the  $Y^{3+}$  ion concentration.  $Hf_{0.8}Y_{0.2}O_{1.9}$  yielded the highest TEC of

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