atoms and molecules through the microstructure, improving the consequent densification.

Further advantageously, the disclosed method may allow the material to be fabricated at temperatures which do not alter the stoichiometry of the material. This method may therefore allow the fabrication of the material in a more predictable and consistent manner. This may in turn result in materials with a more precise composition. Further, the introduction of Ln in the disclosed method may alter the temperature in which densification occurs, further improving the densification of the material.

In the present disclosure, there is also disclosed a ceramic material fabricated as defined above.

In a third aspect, there is also disclosed an electro-optical device comprising the ceramic material as defined above or fabricated as defined above.

Advantageously, the disclosed electro-optic device comprising the disclosed ceramic material may have electro-optic properties whereby the transparency and the radiation transmission properties of the material may be efficiently changed by applying an external electric field. The change in electro-optic properties may be large and rapid. This may allow the fine-tuning of the optical properties of the material depending on its application. More advantageously, the disclosed ceramic material having this composition may absorb radiation in the UV-Vis range and the far IR range, but not in the near IR range, allowing the ceramic material to be transparent in the near IR range. Advantageously, the disclosed electro-optical device may therefore have useful applications in IR thermography.

Claims

1. A ceramic material having the composition:

$$(A'_{(1-y)}A''_{y})_{(1-x)}Ln_xM_{(1-2x/5)}O_3$$

wherein

$0 < x < 0.1$;

$0 < y < 1$;

A' and A" are independently, alkali metals;

Ln is a lanthanide metal; and

M is a transition metal.

2. The material according to claim 1, wherein Ln is a trivalent lanthanide metal.

3. The material according to claim 1, wherein M is a pentavalent transition metal.

4. The material according to claim 1, wherein $0.04 \leq x \leq 0.07$.

5. The material according to claim 1, wherein $0.4 \leq y \leq 0.6$.

6. The material according to claim 1, wherein the material has an ABO_3 type crystal structure.

7. The material according to claim 1, wherein the material has the composition:

$$(Na_{0.5}K_{0.5})_{(1-x)}La_xNb_{(1-2x/5)}O_3$$

wherein $0 < x < 0.1$.

8. A method for fabricating a ceramic material comprising the step of contacting alkali metal starting materials, a lanthanide metal starting material, a transition metal starting material and oxygen according to the composition:

$$(A'_{(1-y)}A''_{y})_{1-x}Ln_xM_{(1-2x/5)}O_3$$

wherein

$0 < x < 0.1$;

$0 < y < 1$;

A' and A" are independently, alkali metals;

Ln is a lanthanide metal; and
M is a transition metal.

9. The method according to claim 8, wherein Ln is a trivalent lanthanide metal.

10. The method according to claim 8, wherein M is a pentavalent transition metal.

11. The method according to claim 8, wherein $0.04 \leq x \leq 0.07$.

12. The method according to claim 8, wherein $0.4 \leq y \leq 0.6$.

13. The method according to claim 8, further comprising a step of forming a solid solution, and calcining the solid solution at a temperature range of 750 °C to 900°C, wherein the calcination is performed for a duration of 2 hours to 6 hours.

14. The method according to claim 8, further comprising a step of compacting of the solid solution, and sintering the solid solution at a temperature range of 1000°C to 1350 °C, wherein the sintering is performed for a duration of 2 hours to 12 hours.

15. An electro-optical device comprising the ceramic material as claimed in claim 1 or fabricated according to claim 8.

16. The device according to claim 15, further comprising two electrodes on either side of the ceramic material.

17. The device according to claim 15, wherein the optical properties are tunable by applying an external electric field, wherein the tuning comprises increasing the transparency of the material at wavelengths between 750 nm and 2800 nm.

18. The device according to claim 15, wherein the device is operable at room-temperature.