

High-entropy sesquioxide X_2O_3 upconversion transparent ceramics.

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Rok wydania

2020

Czasopismo

Scripta Materialia

Numer woluminu

186

Strony

19-23

DOI

10.1016/j.scriptamat.2020.04.011

Kolekcja

Naukowa

Język

Angielski

Typ publikacji

Artykuł

Streszczenie

In this study, a high-entropy approach was used to design a highly transparent (81.3% in-line transmittance) sesquioxide X_2O_3 ceramics, in which a single-phase solid solution, with the general formula $(Lu_{0.2}Y_{0.395}Gd_{0.2}Yb_{0.2}Tm_{0.005})_2O_3$, was obtained after sintering under vacuum with La_2O_3 and ZrO_2 as the sintering additives. Upconversion emission from Tm^{3+} ion at 485 nm was demonstrated upon the 980 nm laser emission excitation as a result of cooperative energy transfer from the Yb^{3+} ions. High-resolution scanning electron microscope (SEM) and Energy Dispersive X-Ray Spectroscopy (EDS) elemental mapping showed that the obtained transparent ceramics were pore-free and without segregation of different elements.

Słowa kluczowe

high-entropy, Transparent ceramics, Upconversion, sesquioxide

Adres publiczny

<http://dx.doi.org/10.1016/j.scriptamat.2020.04.011>

Strona internetowa wydawcy

<http://www.elsevier.com>