

TEM Study on Nucleation and Grain Growth of SrBi₂Nb₂O₉ Thin Films

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B₁-layered perovskite SrBi₂Nb₂O₉ (SBN) thin films have been deposited on Si (100) substrates by metalorganic decomposition technique. The SBN thin films were post-annealed at 700°C in a pre-heated annealing chamber for the investigation of crystallization processes. A high resolution transmission electron microscopy study showed a nucleation process and a grain growth mechanism of the SBN thin films from the fluorite-like to the B₁-layered perovskite phase. In an initial stage of the nucleation process, adjacent 10 nm-sized fluorite-like grains with a similar orientation were phase-transformed to B₁-layered perovskite grains, when a lot of defects such as Antiphase Boundaries (APBs) were induced due to a little crystallographic difference of the adjacent grains. The size of the B₁-layered perovskite grains is about 0.2 – 0.3 μm and many defects such as APBs have been considerably diminished after further 30 min annealing process. This grain growth type is different from a conventional elliptical grain growth at the point of grain growth mechanism and grain size. Moreover, the surface morphology of the SBN thin film was remarkably improved compared with that of the elliptically grown SBN thin films.

금속산화물의 적외선 복사특성에 관한 연구

A Study on Infrared Radiant Properties of a Metallic Oxide

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요업(세라믹)기술원 도자기연구센터

일반적으로 몇 가지 종류의 원료가 합성된 재료는 합성되는 “원재료”의 각각의 물성을 함께 갖춘 물성을 나타내는 것이 많으며 적외선 복사특성에 대해서도 같은 경향을 갖는다. 세라믹스의 적외선 복사특성은 그것을 구성하는 금속원소와 밀접한 관계가 있다. 본 연구에서는 전이금속 산화물을 중심으로 금속산화물들에 대한 적외선 분광복사특성을 평가하기 위해 대기 중 Gas 분석용으로 쓰이는 고감도 FT-IR을 원적외선 영역에서 물체의 표면방사에너지 측정이 가능하도록 설계하여 저온영역에서 금속산화물들에 대한 원적외선 방사스펙트럼(반구면 복사 발산도와 적분에너지강도)을 측정하므로써, 금속산화물 이 emissivity라고 알려진 표면복사 물성값에 미치는 특성을 확인하였다.