

분쇄-침전을 이용한 다결정 YAG 세라믹스의 합성

Synthesis of Polycrystalline YAG Ceramics Prepared by Milling-precipitation

홍석범, 정현기, 심수만
홍익대학교 재료공학부

알루미나 분말을 분쇄하면서 Y 수화물을 동시에 침전시켜 YAG 분말을 합성하였다. 하소 분말(1200°C, 4 h)에는 YAG 외에 소량의 YAM이 남아 있었다. 그러나 평균 입경 0.57 μm으로 분쇄한 분말 성형체에서는 산화물 혼합법에서 YAG 단일상이 얻어지는 온도(1500~1600°C) 보다 훨씬 낮은 1300°C에서 YAG 단일상이 이미 형성되었다. 분말의 소결성은 우수하여 소결조제 SiO₂(350 ppm Si)의 첨가에 관계없이 치밀화가 잘 일어났다. SiO₂를 첨가하지 않은 경우, 1600°C에서 98%의 소결밀도를 얻었다. SiO₂를 첨가한 경우에는 1500°C에서 치밀화가 더 잘 일어나 97.7%의 소결밀도가 얻어졌으며, 1600°C에서는 SiO₂의 소결 촉진 효과가 나타나지 않아 밀도는 SiO₂를 첨가하지 않은 시편과 비슷하였다.

Microstructural Morphology of Indium Tin Oxide Thin Films Prepared by Sol-gel Spin-coating Process

Mi-Jeong Choi, Hyun-Woong Han, Young-Hoon Yun, and Sung-Churl Choi
Department of Ceramic Engineering, Hanyang University

ITO thin films were formed on glass substrates by the sol-gel method. The starting solution was prepared by mixing indium (III) acetylacetonate, 2-methoxyethanol and tin (IV) isopropoxide. The mixed solution, which was obtained from the indium and tin precursor, was coated on non-alkali glass substrates using spin-coating process. Then, ITO thin films were fired and annealed to 500°C for 30 min under the non-oxidizing atmosphere, N₂ and Ar. Surface morphologies of ITO thin films were observed by FE-SEM, HR-SEM.

Microstructural morphology (grain size) of ITO thin films indicated the notable differences according to the annealing atmospheres. It was thought that the organic decomposition and crystallization behavior were influenced remarkably by the annealing conditions. It seemed that relatively low electrical resistivity of thin films could be achieved by densification behavior of ITO films through the control of heating conditions. The densified microstructure of ITO thin films could be observed in the cross sectional morphology using high-resolution SEM.