

Flux pinning properties in $\text{YBa}_2\text{Cu}_3\text{O}_{7-\delta}$ multilayered films with second phases prepared by PLD method

情報電気電子工学科	助教	末吉哲郎
	教授	藤吉孝則
	教授	宮原邦幸
	教授	池上知顯
	教授	蛭原健治
大学院自然科学研究科	前期課程	渡邊昌貴
	後期課程	春田正和
熊本県工業技術センター		宮川隆二

We present the experimental studies on structures and superconducting properties of two different types of $\text{YBa}_2\text{Cu}_3\text{O}_{7-\delta}$ multilayered films with second phases prepared by pulsed laser deposition. As second phase materials, Y_2O_3 and ZnO were inserted into films, respectively. The nano-particles were observed on a $\text{YBa}_2\text{Cu}_3\text{O}_{7-\delta}$ layer when several pulses for second phase materials target ablation were chosen for both Y_2O_3 and ZnO . The critical temperatures of almost multilayered films were slightly reduced as compared to that of the pure $\text{YBa}_2\text{Cu}_3\text{O}_{7-\delta}$ film, while the superconductivity was destroyed in the case of excess doping of ZnO . For half-multilayered films which consist of a lower layer with multilayer and an upper one with mono- $\text{YBa}_2\text{Cu}_3\text{O}_{7-\delta}$, the most improved critical current densities were observed in both cases of Y_2O_3 and ZnO inclusions. This result indicates that there is a hope of further enhancement of critical current density by choosing the optimum in variety of spatial distributions of nano-particles, in addition to optimizing the dope level.

(20th International Symposium on Superconductivity VPP-2, November 5-7, 2007 Tsukuba, Japan)