

잉크젯 프린팅 공정을 이용한 3D Integration 집적 기술의 무소결 고충진 유전체막 제조

Inkjet Printing Process to Fabricate Non-sintered Low Loss Dielectric Thick Films with High Packing Density for 3D Integration Technology

Hun Woo Jang***, Jihoon Kim*†, Eunhae Koo*, Hyo Tae Kim*, Young Joon Yoon*, Hae Jin Hwang** and Jong-hee Kim*

*Future Convergence Ceramic Division, Korea Institute of Ceramic Engineering and Technology, Seoul, 153-801, Korea,

** Department of Ceramics, Inha University, Incheon, 402-751 Korea

†corresponding author: Jihoon Kim (jihoon.kim@kicet.re.kr)

Abstract : We have successfully demonstrated the inkjet printing process to fabricate Al_2O_3 thick films without a high temperature sintering process. A single solvent system had a coffee ring pattern after printing of Al_2O_3 dot, line and area. In order to fabricate the smooth surface of Al_2O_3 thick film, we have introduced a co-solvent system which has nano-sized Al_2O_3 powders in the mixture of Ethylene glycol monomethyl ester and Di propylene glycol methyl ether. This co-solvent system approached a uniform and dense deposition of Al_2O_3 powders on the substrate. The packing density of inkjet-printed Al_2O_3 films is more than 70% which is very high compared to the value obtained from the films synthesized by other conventional methods such as casting processes. The characterization of the inkjet-printed Al_2O_3 films has been implemented to investigate its thickness and roughness. Also the dielectric loss of the films has been measured to understand the feasibility of its application to 3D integration package substrate.

Key Words : Inkjet printing, dielectric thick film, packing density, co-solvent system