EFFECTS OF DOPANTS ON FIELD APPLIED METAL INDUCED LATERAL CRYSTALLIZATION RATE

Ji-Su Ahn, Seung-Ki Joo*

Samsung SDI Co., LTD
818, Kachun-Ri, Samnam-Myun, Ulju-Gun, Ulsan, Korea
*School of Materials Science and Engineering, Seoul National Univ.,
San 56-1 Shinrim-Dong Kwanak-Ku 8Seoul, Korea

Polycrystalline silicon thin film transistors (poly-Si TFTs) technology is very attractive for the applications of active matrix liquid crystal devices (AM-LCDs) with integrated peripheral driver circuits fabricated on glass substrates. So many works have been concentrated on lowering the crystallization temperature of a-Si films. Metal induced lateral crystallization (MILC) process has been previously introduced, by which the amorphous silicon thin films can be crystallized below 500℃. It has already reported that applying electric field during MILC enhances MILC rate against field direction. In this works, the effects of dopants on the rate and behavior of field-applied-MILC were investigated. We have doped a-Si with B_2H_6 or PH_3 gas by Ion Mass Doping System and We applied electric field (100V/cm) during MILC. When a-Si was doped with PH_3, MILC rate has also increased against field direction, while MILC rate has increased toward field direction when a-Si was doped with B_2H_6.

The role of dopants in Field-Applied-MILC(FALC) rate will be discussed in terms of Ni ion and charged Ni vacancy (NINV) Hopping Model.

Reference
(1) S.W. Lee and S.K. Joo: IEEE Electron Device Lett. 17, 160 (1996)
(2) J.B. Lee, et. al. : Japanese J. Appl. Phys. 40, 6177 (2001)
(3) T.Ma and M. Wong : J. Appl, Phys., 91, 1236 (2002)
(4) S.-I. Jun, Y.H. Yang, J.B. Lee, and D.K. Choi, “Appl. Phys. Lett.”. vol 75, p. 2235, 1999.
(5) I. Suni et. al : Appl. Phys. Lett. 40 269 (1982)

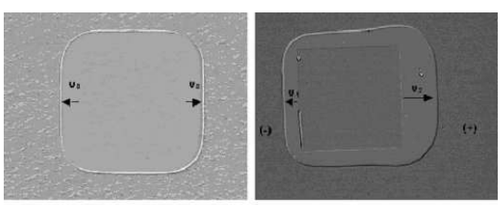

Fig. 1 MILC and FALC aspect of Intrinsic sample

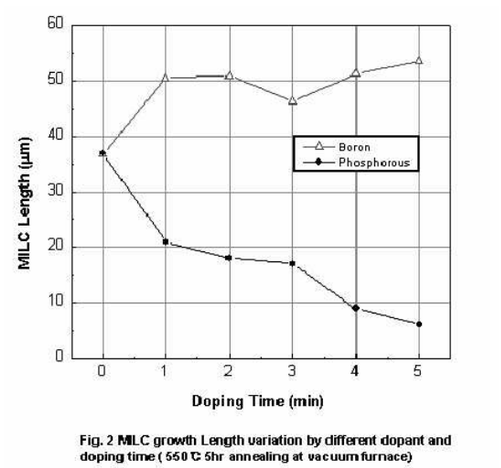

Fig. 2 MILC growth Length variation by different dopant and doping time (550℃ 5hr annealing at vacuum furnace)

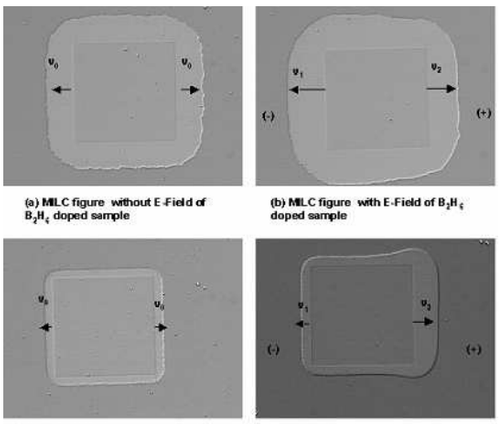

Fig. 3 MILC and FALC aspect of B_2H_6 or PH_3 doped sample