The effect Crystal Filter on Metal Induced Lateral Crystallization orientation

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Polycrystalline Silicon (poly-Si) thin-film transistors(TFTs)is very attractive technology for the application of active matrix liquid crystal devices (AM-LCDs) with integrated peripheral driver circuits fabricated on glass substrates. So many workers have been concentrated on lowering the crystallization temperature of amorphous silicon films. Recently, metal induced lateral crystallization (MILC) process has been introduced, by which the amorphous silicon (a-Si) thin films could be crystallized at a temperature below 500□[1,2]
However, we have recently observed that the leakage current of poly-Si TFTs using MILC is higher than that of others. Because the captured $NiSi_2$ caused silicide contamination at the TFT channel region.[2] To obtain lower silicide contamination and defects than that of others, it is necessary that uni-oriented poly-Si at the TFT channel region. So, the effects of crystal filter on MILC(Metal Induced Lateral Crystallization) orientation were studied. Pattering crystal filter in active later, we compared the direction of Si crystallization pass crystal filter with not. The growth directions of Si crystallization were investigate using EBSD(electron back scattering diffraction). Comparing the region which was crystallized by MILC method using crystal filter with crystallized region without crystal filter, filtered crystallized region was more- unidirectional crystallized than without crystal filter. Also as the width of crystal filter was narrower from 1 ㎛ to 8 ㎛, crystal directions became more unidirectional crystallized region.

Reference

[1] S.W. Lee and S.K. Joo, “Low temperature poly-Si thin-film transistor fabrication by metla-induced lateral crystallization,” IEEE Electron Device Lett. 17, 160 (1996)
[2] I.H. Ihn, T.K. Kim, B.I. Lee, and S.K. Joo: Microelectronics Reliability 39, p53 (1998)

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