

## Superconducting Thin Films of $\text{SrFe}_{2-x}\text{Co}_x\text{As}_2$ Grown by PLD Technique with Eximer Laser

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We have successfully fabricated Co-doped bilayered  $\text{SrFe}_2\text{As}_2$  thin films on the  $\text{Al}_2\text{O}_3$  (0001) substrates by a pulsed laser deposition (PLD) technique by using KrF excimer laser ( $\lambda = 248$  nm), which is different from previous technique done by Hiramatsu *et al.* [Appl. Phys. Express **1**, 101702 (2008)] where they used Nd:YAG ( $\lambda = 532$  nm) laser. We tried to find optimum growth condition by changing various experimental conditions, such as substrate temperature, working pressure, and laser energy density. As-grown Co-doped  $\text{SrFe}_2\text{As}_2$  thin films on the  $\text{Al}_2\text{O}_3$  (0001) substrates at a growth temperature of  $770^\circ\text{C}$  showed a superconducting transition temperature of  $\sim 20$  K with broad transition width of  $\sim 3$  K irrespective of the laser energy density. As increasing growth temperature from  $760$  to  $810^\circ\text{C}$ , superconducting transition temperatures sustained while superconducting transition width is slightly changed. These results are not well optimized yet but very close to those of the best films previously reported by Hiramatsu *et al.*. In addition, we will discuss on the growth mechanism based on XRD, SEM, and EDS data.

Keywords: Co-doped  $\text{SrFe}_2\text{As}_2$ , Superconducting thin film, PLD