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The improvement of electrical properties of InGaZnO (IGZO)4(IGZO) TFT by treating post-annealing process in different temperatures.

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As display industry requires various applications for future display technology, which can guarantees high level of flexibility and transparency on display panel, oxide semiconductor materials are regarded as one of the best candidates. $InGaZnO_4$ (IGZO) has gathered much attention as a post-transition metal oxide used in active layer in thin-film transistor. Due to its high mobility fabricated at low temperature fabrication process, which is proper for application to display backplanes and use in flexible and/or transparent electronics. Electrical performance of amorphous oxide semiconductors depends on the resistance of the interface between source/drain metal contact and active layer. It is also affected by sheet resistance on IGZO thin film. Controlling contact/sheet resistance has been a hot issue for improving electrical properties of AOS(Amorphous oxide semiconductor). To overcome this problem, post-annealing has been introduced. In other words, through post-annealing process, saturation mobility, on/off ratio, drain current of the device all increase. In this research, we studied on the relation between device's resistance and post-annealing temperature. So far as many post-annealing effects have been reported, this research especially analyzed the change of electrical properties by increasing post-annealing temperature. We fabricated 6 main samples. After a-IGZO deposition, Samples were post-annealed in 5 different temperatures; as-deposited, 100°C, 200°C, 300°C, 400°C and 500°C. Metal deposition was done on these samples by using Mo through E-beam evaporation. For analysis, three analysis methods were used; IV-characteristics by probe station, surface roughness by AFM, metal oxidation by FE-SEM. Experimental results say that contact resistance increased because of the metal oxidation on metal contact and rough surface of a-IGZO layer. we can suggest some of the possible solutions to overcome resistance effect for the improvement of TFT electrical performances.