

Comparison of aluminium with copper for better contact on FTO glass substrate

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In this paper we are discussing about the contact that are formed using two metals i.e. aluminum (Al) and copper (Cu) on fluorine doped tin oxide (FTO) coated on glass substrate and contact resistance. The metals are individually coated on different FTO substrates using thermal evaporation techniques and the coating area was 5 mm². The thickness of FTO substrate, aluminum and copper thin film were measured using the stylus profilometer and values are found to be 10000 Å, 2057 Å and 2040 Å respectively. The resistances of the film were measured using probe station and semiconductor analyzer. The resistance values of Al, Cu and FTO are 15 Ω, 11 Ω, 40 Ω respectively. The contact resistances between the Al-FTO and Cu-FTO are measured using I-V measurement system and respective graphs are as shown in the Figure 1 and Figure 2.

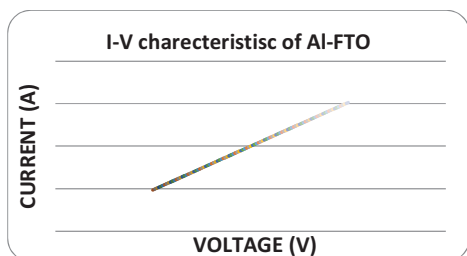


Figure 1: I-V characteristic of Al-FTO

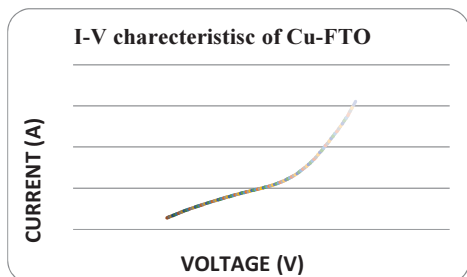


Figure 2: I-V characteristic of Cu-FTO

The samples are heated up to 120 °C and the graphs are plotted as shown in Figure 3 and Figure 4.

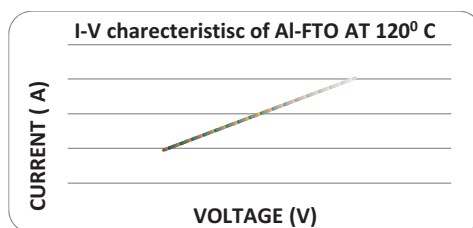


Figure 3: I-V characteristic of Al-FTO AT 120 °C

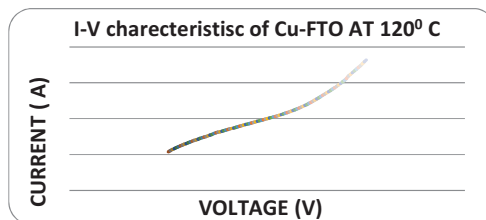


Figure 4: I-V characteristic of Cu-FTO AT 120 °C

From the graphs it clearly predicted that values is same as that of room temperature and also it clearly state that the contact between the Al-FTO is Ohmic contact and that of Cu-FTO is rectifying contact. The plot shows that the Al-FTO forms the better contact than Cu-FTO.

References

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