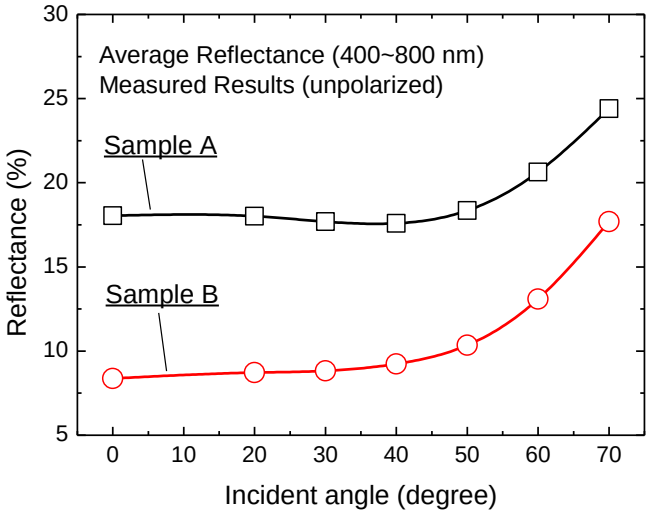

Fig. 8. Measured average reflectance of sample A and B as a function of incident angle for unpolarized light.

5. Conclusion

In summary, the novel thin film a-Si solar cell structure with GRIS was proposed for suppressing the reflectance at the interface between ITO layer and a-Si layer. The antireflective GRIS which has the refractive index matched to the ITO layer is placed on the absorptive layer, thus reducing the reflection from that interface mentioned above. The optical property of the structure was investigated theoretically and experimentally, and the calculated results in reasonable agreement with the measured results. The GRIS was fabricated by e-beam evaporation with OAD technique, hence the effective refractive index of a-Si can be varied controllably by angle of incident e-beam flux. The reflectance of solar cell structure with the GRIS is suppressed over the whole desired wavelength range, and its average value in the wavelength range 400-800 nm was decreased by 54% from the conventional solar cell structure without the GRIS. Compared to other antireflective structures, the structure with the GRIS of a-Si is more promising for the enhancement of efficiency of superstrate type thin film a-Si solar cells.

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