**Title of the paper**

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**Abstract** (Max 100 words**)**

In the present work, we have presented the metal oxides (TiO2 and CuO) for energy saving and harvesting applications. Multilayer coating structure comprising a copper (Cu) layer sandwiched between titanium dioxide (TiO2) were demonstrated as a heat reflecting coating on glass for energy-saving window application. The main highlight is the utilization of Cu, a low-cost material, in-lieu of silver which is widely used in current commercial heat reflecting coasting on glass. Cupric oxide based heterojunction solar cells have been discussed for the energy harvesting application.

1. **Introduction**

Metal oxides are promising candidates for solar energy harvesting and energy saving application. Low cost photovoltaic technology is essential to meet the large scale electrical supply with low carbon emission. Metal oxides such as zinc oxide, ZnO, copper oxides (Cu2O and CuO), and titanium oxide, TiO2 have been investigated for renewable energy applications [1]. On the other hand, transparent heat reflecting (THR) coating has a high reflectance at the near infrared (IR) radiation solar spectrum and a high transmittance at the visible region, has great potential to reduce the electrical consumption [2Presently, conventional IR reflectors are made of silver (Ag) due to its color neutrality. However, Ag is expensive. Similarly, Au exhibits optimum reflectivity spectrum of heat reflecting coating, but its potential is greatly reduced by the high price of gold. On the other hand, copper (Cu) has high reflectivity of IR radiation and low market price compared to the Ag and Au. Towards this, we have developed the Cu-based low cost heat reflector coating for the THR window (THRW) application. In addition, we have also shown the CuO based heterojunction solar cells for energy harvesting applications.

1. **Results**

Multilayer coating structure comprising a copper (Cu) layer sandwiched between titanium dioxide (TiO2) were demonstrated as a heat reflecting coating on glass for energy-saving window application. Fig. 1 shows the heat reflecting property of the coating. The performance of the THR can be tuned through thermal treatment.

Fig 1: Transmittance spectra of TiO2/Cu/TiO2 coating on glass substrates. (At least 1 Figure)

We have also demonstrated cost-effective solar cells using sputter grown p-CuO/n-Si hetero structure

**III. Conclusion**

We have demonstrated TiO2 based THR with visible transmittance ~90%. Interface quality at the p-CuO/n-Si is key issue to improve the device performance.

**References**

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