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Temperature-time dependent delamination energy of thermally reduced graphene oxide on soda lime glass as transparent conducting electrode

ITO and FTO coated glass, transparent conducting electrodes, have received much attention in the field of solar cells, flat panel displays, light emitting diodes and field emission devices. But being highly brittle, toxic and very expensive, these electrodes need a better replacement. Graphene, being highly conductive, transparent, flexible, strong and sustains high temperature, is one of the proposed replacement material for ITO/FTO coating. In this study, graphene oxide (GO) was deposited on soda lime glass through a simple and low cost thin film deposition technique (dip coating), followed by reduction of GO to reduced graphene oxide (rGO) through thermal annealing. The film showed transparency and conductivity uniformly throughout the substrate. Since device life strongly depends on bonding of the film with substrate, so bonding strength of GO and rGO with soda lime glass was also measured using nano-scratch technique. Bonding strength was found to depend on annealing temperature and duration.

References

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- [2] S. Das, D. Lahiri, D.-Y. Lee, A. Agarwal and W. Choi, Carbon, 59 (2013) 121.
- [3] S. Das, D. Lahiri, A. Agarwal and W. Choi, Nanotechnology, 25 (2014) 045707.

Figures

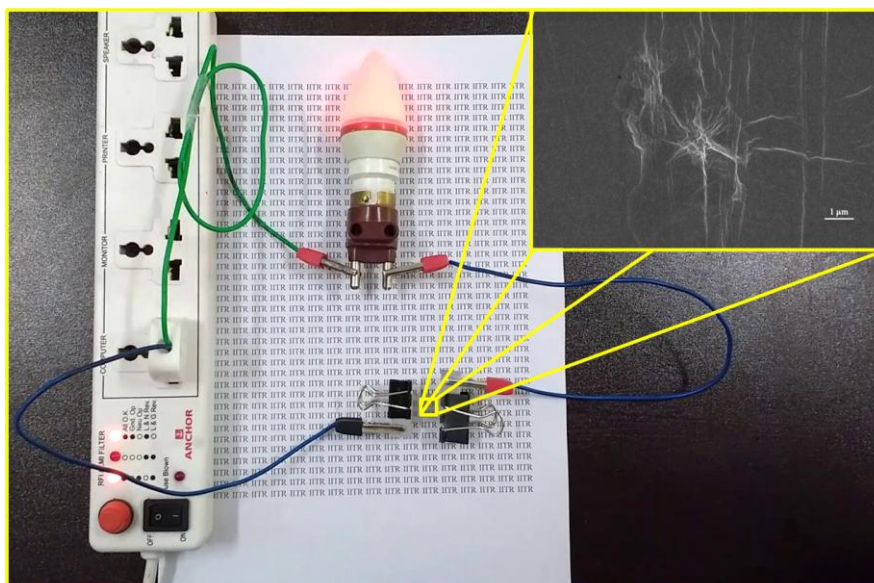


Figure 1: rGO/soda lime glass showed good transparency and conductivity

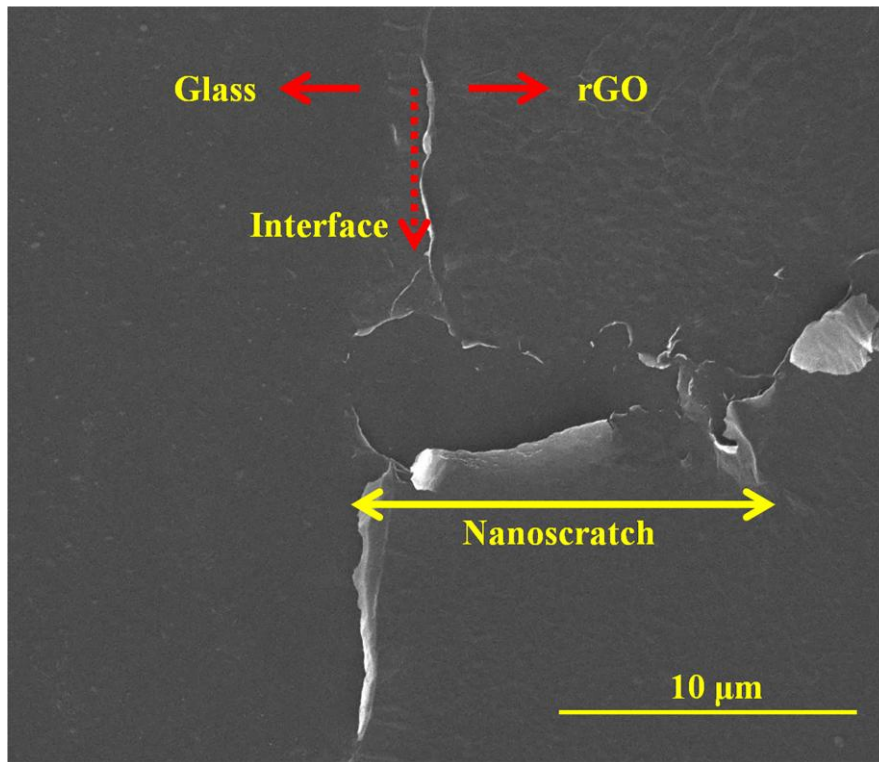


Figure 2: FESEM image of nano-scratched thermally reduced graphene oxide on soda lime glass