Electronic Supplementary Material (ESI) for RSC Advances.


# Supporting Information

# Flexible Resistive Switching Bistable Memory Devices using ZnO nanoparticles embedded in polyvinyl alcohol (PVA) matrix and poly(3,4-ethylenedioxythiophene) polystyrene sulfonate (PEDOT:PSS)

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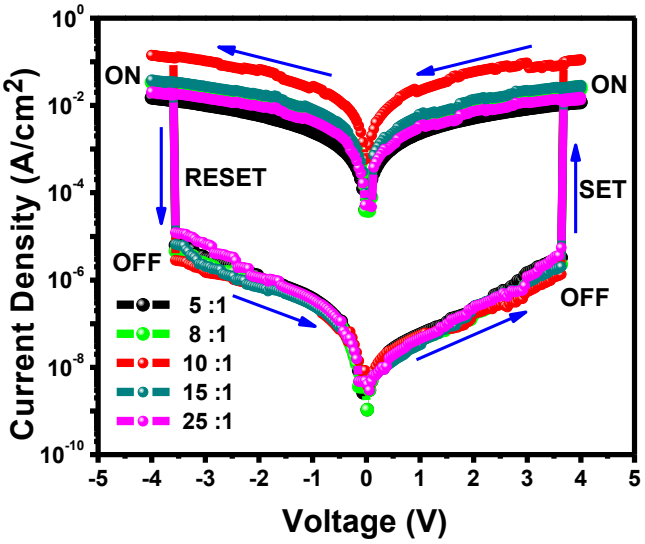


**Figure SF 1** Current-voltage (*I-V*) switching characteristics of Al/ZnO-PVA/PEDOT:PSS/Al /flexible PET substrate devices at different concentration of ZnO in ZnO-PVA nanocomposites

**Figure SF 1** shows the resistive switching behaviour of ZnO-PVA/PEDOT: PSS device with different concentration of ZnO in ZnO-PVA nanocomposites. It is observed that, the ON state/OFF state current ratio increases with increasing concentration of ZnO and reaches maximum at concentration ratio of 10:1 with ON state/OFF state current ratio ~ $3\times10^5$ in magnitude and beyond the value 10:1, the ON state/OFF state current ratio decreases. It

should be noted that, the increase of ON state/OFF state current ratio with increasing concentration of ZnO due to the increase of conducting phase in insulating matrix. After a certain concentration of ZnO, the value of ON state/OFF state ratio decreases. This may be due to the formation of interconnected paths created by ZnO nanocomposite/PEDOT:PSS in the device, which causes depolarization and charge captured in the valence subband of ZnO are released into the PVA matrix. As a result, the "ON state/OFF state" current ratio decreases. This kind of phenomena has been investigated for insulating/conducting nanocomposites and the value of the optimum concentration (for this case, concentration of ZnO:PVA is 10:1) depends on the nature of conducting phase and the insulating matrix.