Supplementary Information (SI) for Nanoscale Advances.
This journal is © The Royal Society of Chemistry 2024

Supporting information

SnS/MnSe Heterostructures for Enhanced Optoelectronics and Dielectric Applications

Abinash Parida[1], Satish Kumar Samal[2], Sripan Chinnaiah[3], Ramakanta Naik[1*]

[1]*Department of Engineering and Materials Physics, ICT-IOC Bhubaneswar, 751013, India*

[2]*Department of Electronics and Communication Engineering, Siksha 'O' Anusandhan, Bhubaneswar 751030, India*

[3]*Crystal Growth and Thin Film Laboratory, Department of Physics, Bharathidasan University, Tiruchirappalli-620024, Tamil Nadu, India*

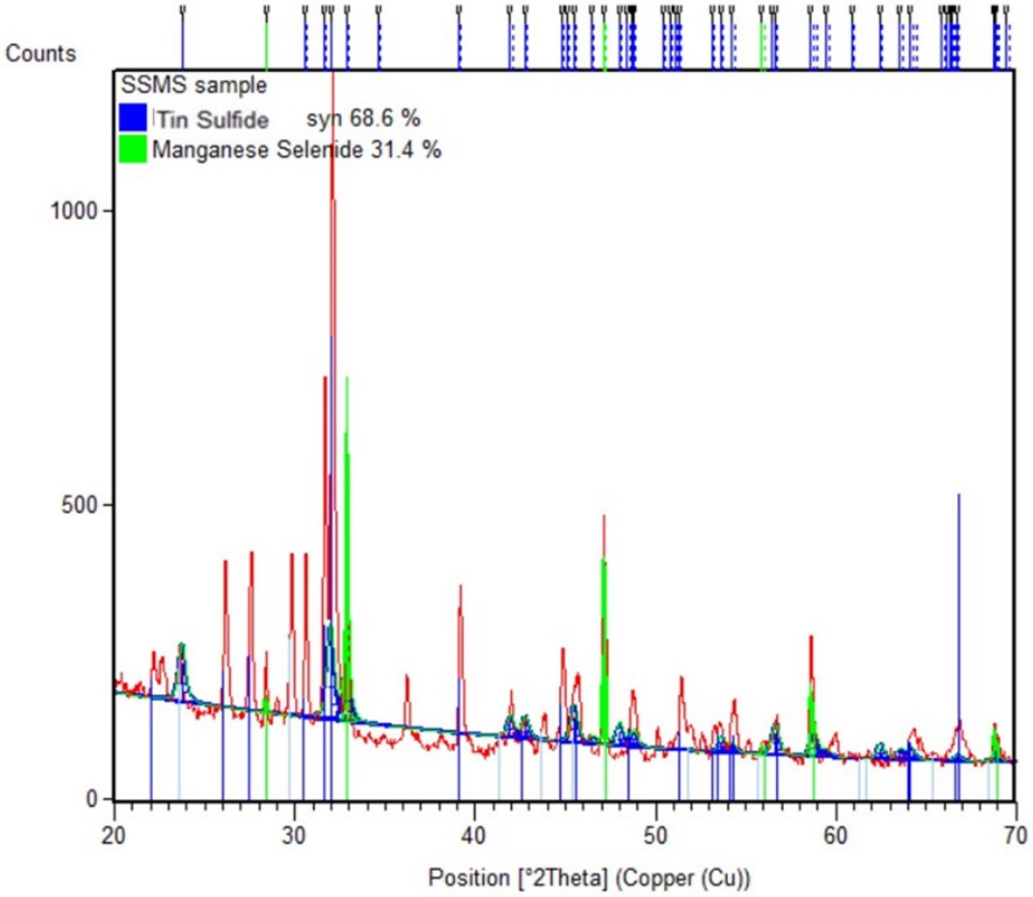

Fig. S1. Rietveld refinement of XRD pattern for SSMS sample.

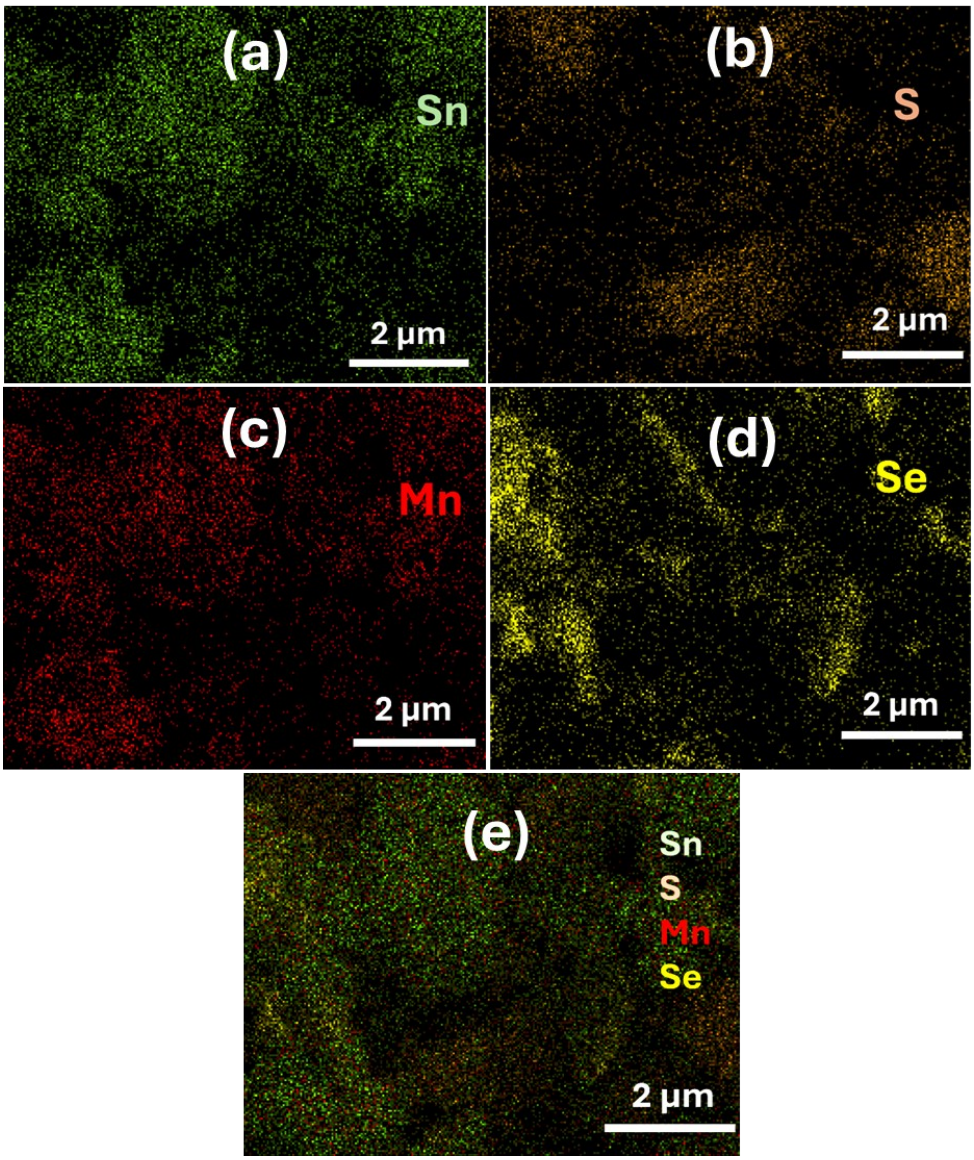

Fig. S2. Elemental mapping of (a) element Sn, (b) element S, (c) element Mn, (d) element Se, and (d) all the constituent elements of SSMS heterostructure sample.

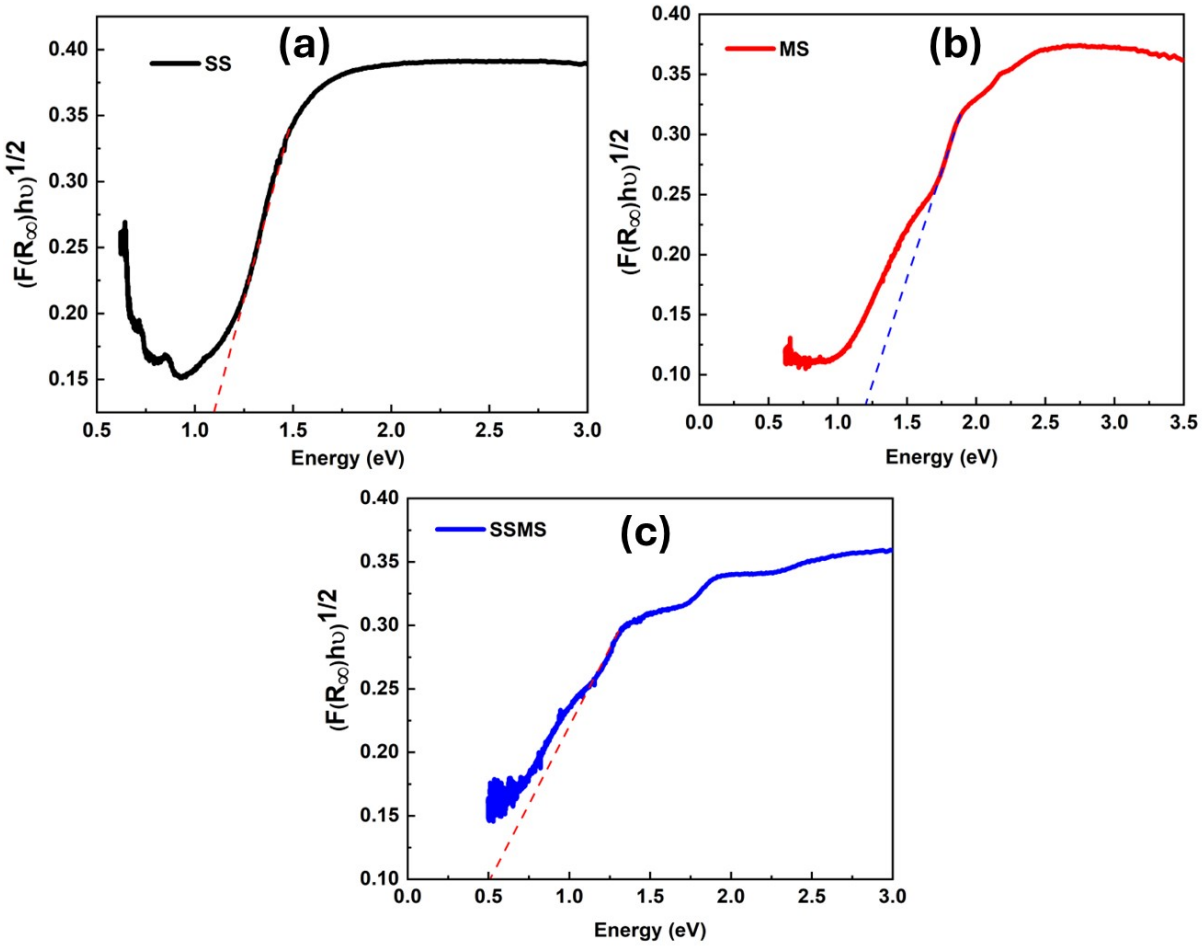

Fig. S3: Calculation of (a) indirect bandgap of SS, (b) indirect bandgap of MS, and (c) indirect bandgap of SSMS heterostructure respectively.

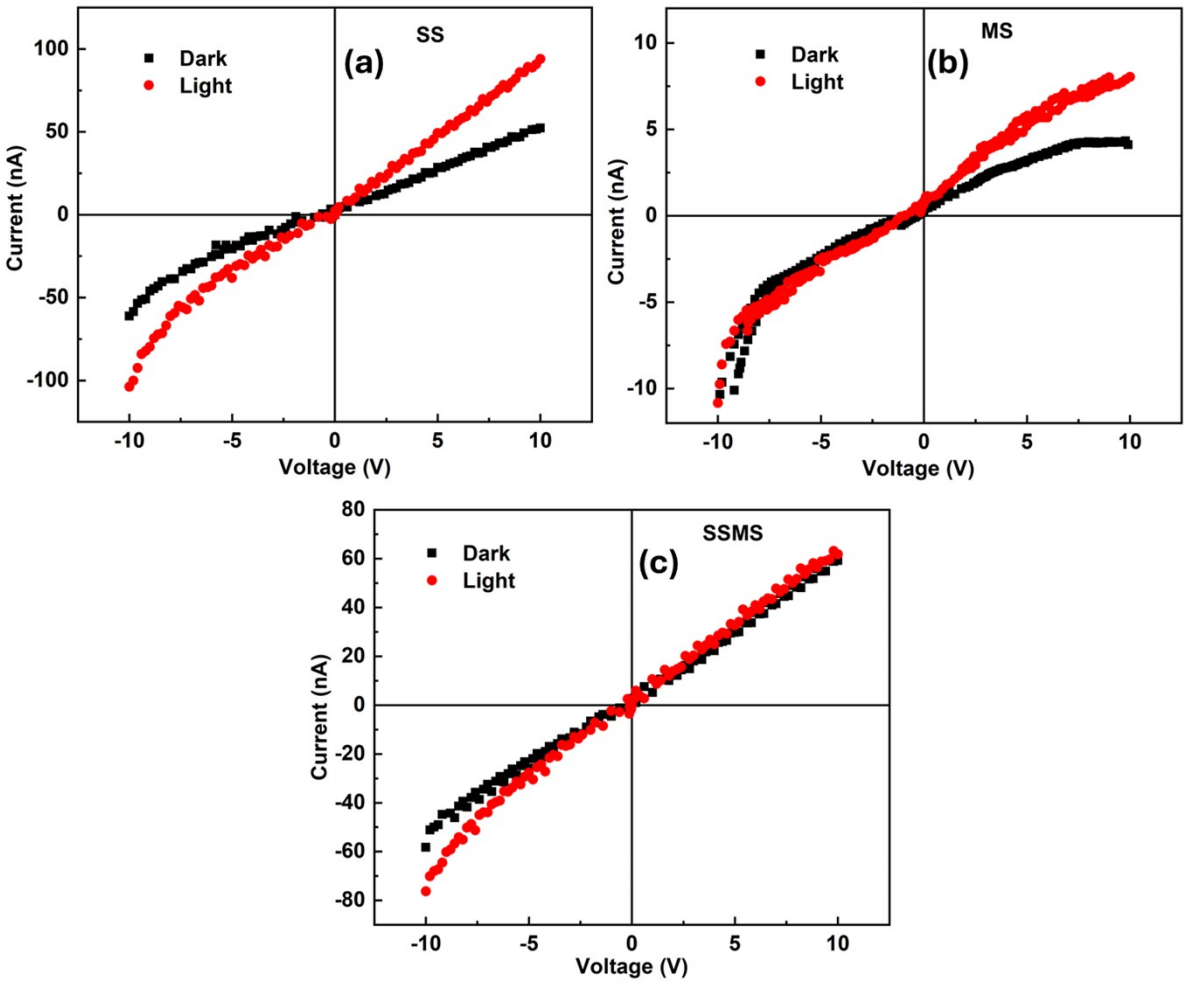

Fig S4: Comparative plot of the light and dark current of (a) SS sample, (b) MS sample, and (c) SSMS heterostructure sample.

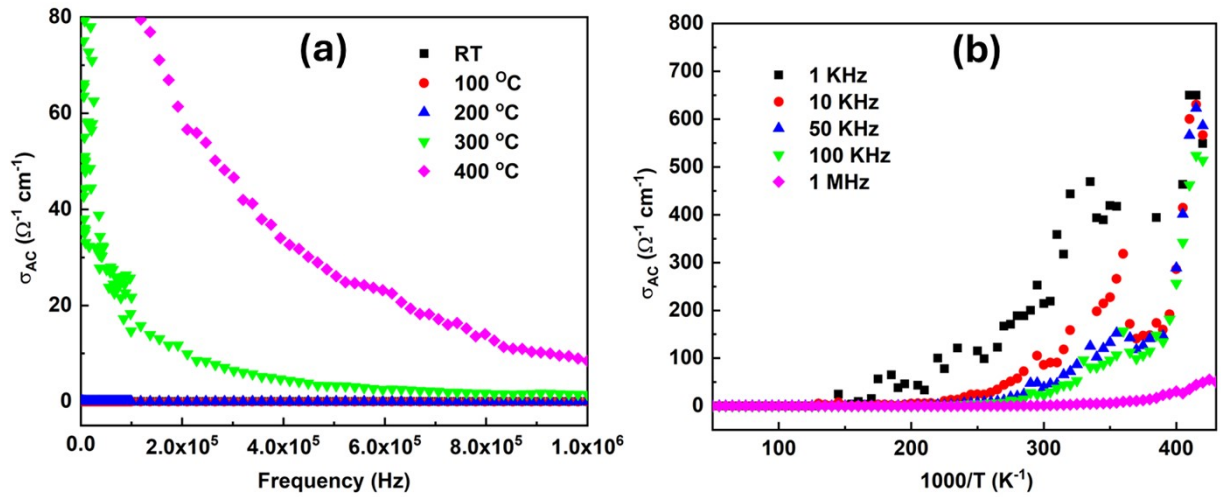

Fig. S5: (a) AC conductivity at different temperatures as a function of frequency. (b) AC conductivity's temperature response when the frequency is changed of SSMS heterostructure sample.

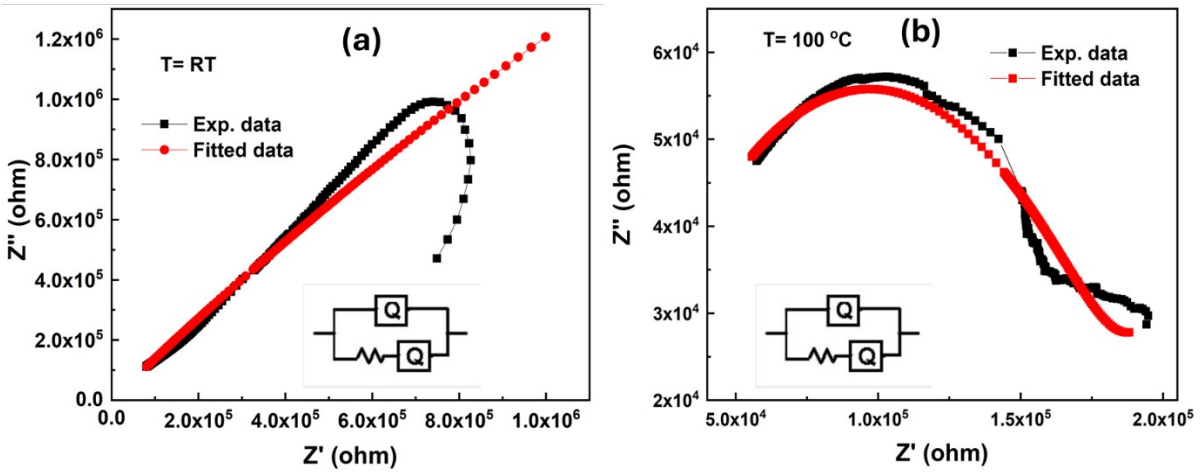

Fig. S6: Cole–Cole plot of SSMS sample sintered at different sintering temperatures (a) T =RT (b) 100 °C. The equivalent circuit configuration (Q(RQ))) is shown in the inset figures.

Samples	Sn (At%)	Mn (At%)	S (At%)	Se (At%)	Total
SS	**38.4**	**-**	**61.6**	**-**	**100**
MS	**-**	**65.2**	**-**	**34.8**	**100**
SSMS	**27.1**	**28.3**	**19.4**	**25.2**	**100**

Table S1: Atomic percentage of constituent elements.