Table S1: Weight percentage of elements

Name of composite	Elements	Weight percentage
P100	Carbon	65.13
	Nitrogen	6.06
	Oxygen	27.02
	Sulphur	1.8
P1G1	Carbon	76.71
	Nitrogen	3.6
	Oxygen	17.92
	Sulphur	1.78
P1G1B	Carbon	73.57
	Nitrogen	1.55
	Oxygen	23.60
	Sulphur	0.95
	Bismuth	0.12
	Tellurium	0.20
P1G2B	Carbon	77.23
	Nitrogen	0.4
	Oxygen	22.06
	Sulphur	0.59
	Bismuth	0.05
	Tellurium	0.06
P1G3B	Carbon	81.92
	Nitrogen	1.28
	Oxygen	15.09
	Sulphur	1.35
	Bismuth	0.17
	Tellurium	0.18

Table S2: Power generated at 30K

Resistance (Ω)	Voltage (mV)	Current (µA)	Power (pW)
0	0.03	0.03	0.9
15000	0.49	0.01	4.9
16000	0.5	0.01	5
17000	0.52	0.01	5.2
18000	0.53	0.01	5.3
19000	0.53	0.01	5.3
20000	0.56	0.01	5.6
21000	0.55	0.01	5.5
22000	0.56	0.01	5.6
23000	0.57	0.01	5.7
24000	0.6	0.01	6
25000	0.61	0.01	6.1

Table S3: Power generated at 50 K

Resistance (Ω)	Voltage (mV)	Current (µA)	Power (pW)
0	0.08	0.07	5.6
15000	1.06	0.04	42.4
16000	1.05	0.04	42
17000	1.08	0.03	32.4
18000	1.14	0.03	34.2
19000	1.17	0.03	35.1
20000	1.22	0.03	36.6
21000	1.24	0.03	37.1
22000	1.24	0.03	37.2
23000	1.27	0.02	25.4
24000	1.28	0.02	25.6
25000	1.31	0.02	26.2

Table S4: Power generated at 70 K

Resistance (Ω)	Voltage (mV)	Current (µA)	Power (pW)

0	0.11	0.1	11
15000	1.26	0.05	63
16000	1.27	0.05	63.5
17000	1.29	0.05	64.5
18000	1.39	0.05	69.5
19000	1.44	0.05	72
20000	1.52	0.05	76
21000	1.68	0.05	84
22000	1.7	0.05	85
23000	1.75	0.04	70
24000	1.78	0.04	71.2
25000	1.8	0.04	72

Table S5: Power generated at 100 K

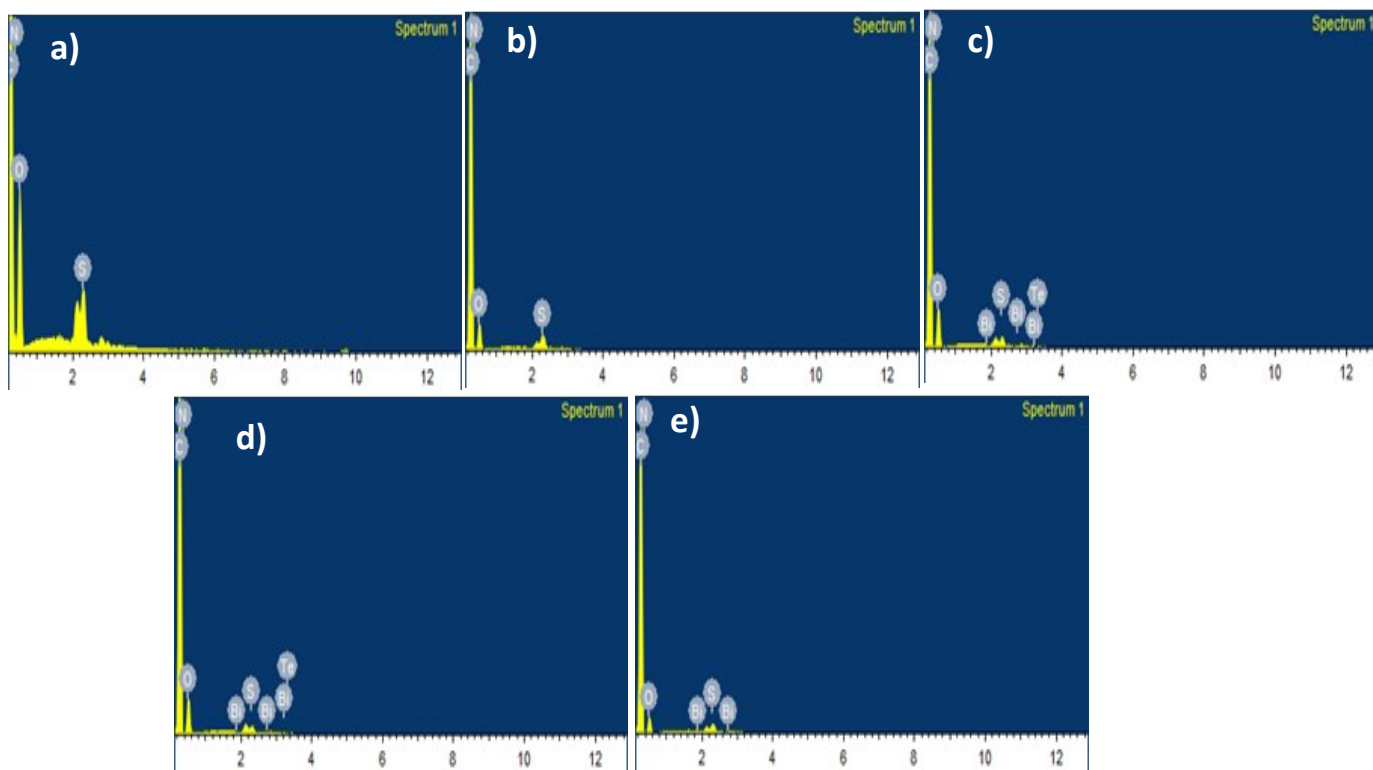| Resistance (Ω)	Voltage (mV)	Current (μA)	Power (pW)
0	0.17	0.16	27.2
15000	1.94	0.07	135.8
16000	1.91	0.08	152.8
17000	2.3	0.09	207
18000	2.34	0.09	210.6
19000	2.37	0.09	213.3
20000	2.36	0.08	188.8
21000	2.39	0.08	191.2
22000	2.41	0.08	192.8
23000	2.42	0.07	169.4
24000	2.42	0.07	169.4
25000	2.44	0.07	170.8

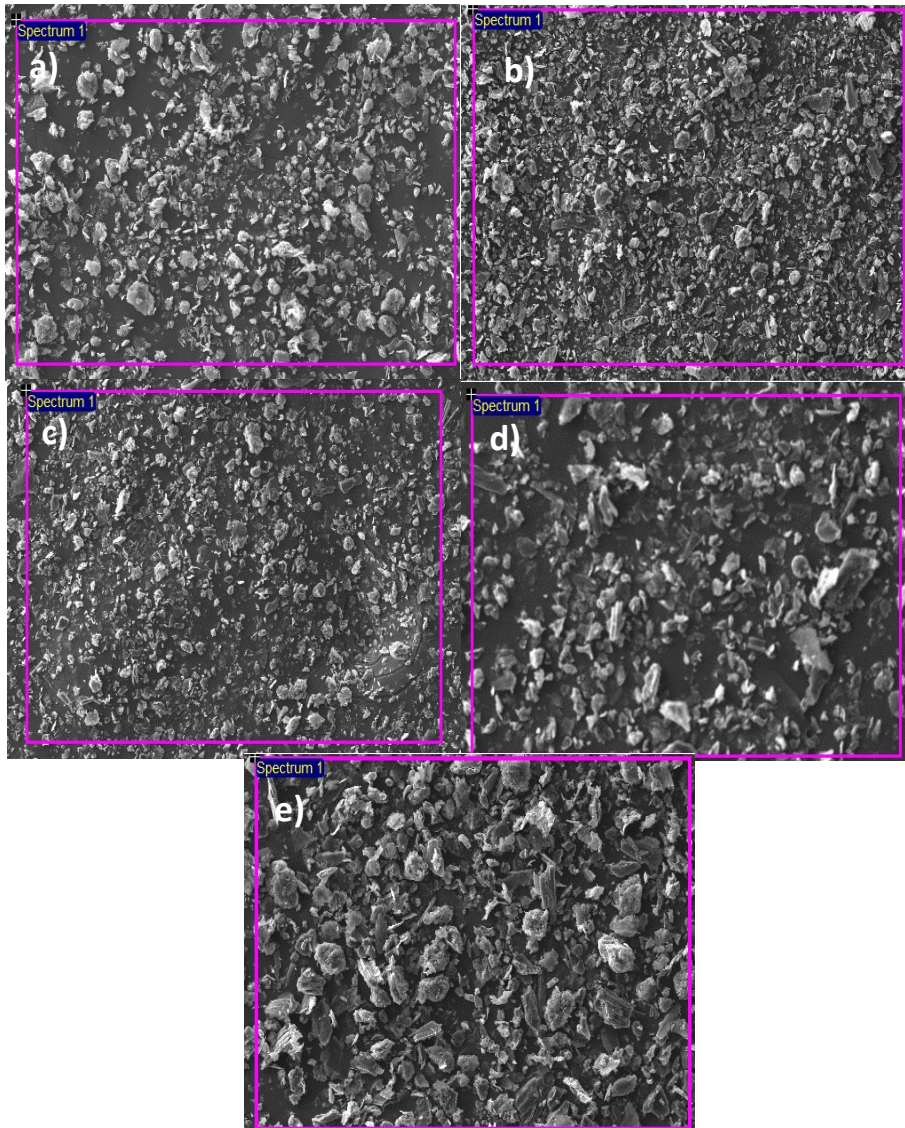**Figure S1: EDS spectrum of (a) P100, (b)P1G1, (c)P1G1B, (d) P1G2B and (e) P1G3B FTEGs**

Figure S2: Corresponding spot positions were EDS spectra are analysed for (a) P100, (b)P1G1, (c)P1G1B, (d) P1G2B and (e) P1G3B FTEGs
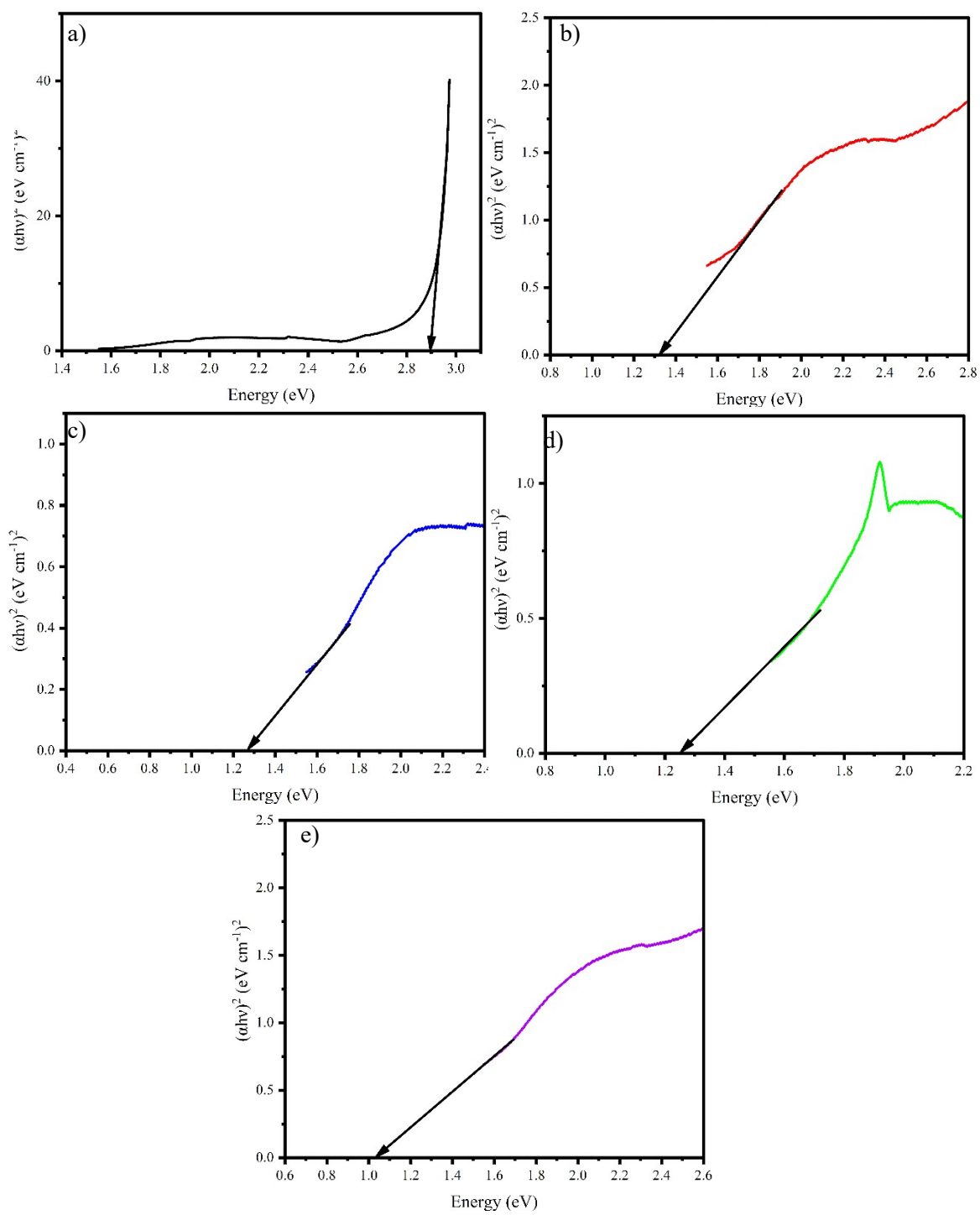
Figure S3: Tauc's plot of (a)P100, (b) P1G1 (c) P1G1B, (d) P1G2B and (e) P1G3B