

SUPPLEMENTAL MATERIALS

Optimizing sputter deposition of Bi₂Te₃ and Sb₂Te₃ for photolithographic device fabrication

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Tables SI and SII present the deposition parameters (factors) gas pressure, RF power and substrate temperature for Sb₂Te₃ and Bi₂Te₃, respectively.

Table SI. Factors, levels, and responses for Sb₂Te₃.

Sample	Run	Gas pressure (mTorr)	RF power (W)	T (°C)	S (μV/K)	t (nm)	ρ (Ω-m)	S^2/ρ (μWm ⁻¹ K ⁻²)
1	6	7	15	175	149	240	0.00079	28.2
2	3	7	15	225	0	225	0.0011	0
3	2	7	25	175	135	500	0.00018	102
4	9	7	25	225	0	630	0.00021	0
5	7	8	15	175	0	160	0.061	0
6	8	8	15	225	0	230	Inf	0
7	1	8	25	175	128	717	0.00025	66
8	4	8	25	225	132	555	0.017	1.00
Mid-point	5	7.5	20	200	141	270	0.088	227

Table SII: Factors, levels, and responses for Bi₂Te₃.

Sample	Run	Gas pressure (mTorr)	RF power (W)	T (°C)	S (μV/K)	t (nm)	ρ (Ω-m)	S^2/ρ (μWm ⁻¹ K ⁻²)
1	6	4	15	175	83	780	0.000056	124
2	3	4	15	225	62	580	0.00011	35
3	2	4	25	175	66	1180	0.00011	38
4	9	4	25	225	56	3530	0.00030	10
5	7	10	15	175	94	770	0.000043	204
6	8	10	15	225	124	1230	0.00013	117
7	1	10	25	175	89	885	0.00036	22
8	4	10	25	225	78	1550	0.00014	42
Mid-point	5	7.5	20	200	93	1310	0.000065	133

Figure 2 presents main effects plots for Sb₂Te₃ and Bi₂Te₃, respectively. Error bars give standard deviations for the averages over the pair of factors other than the main factor on the horizontal axes.

Figure 3 presents interaction effects for Sb₂Te₃. Symbols represent responses averaged over the first factor plotted vs the third factor. We have similar figures for Bi₂Te₃ but cannot include here due to 2-page limit set on supplemental document.

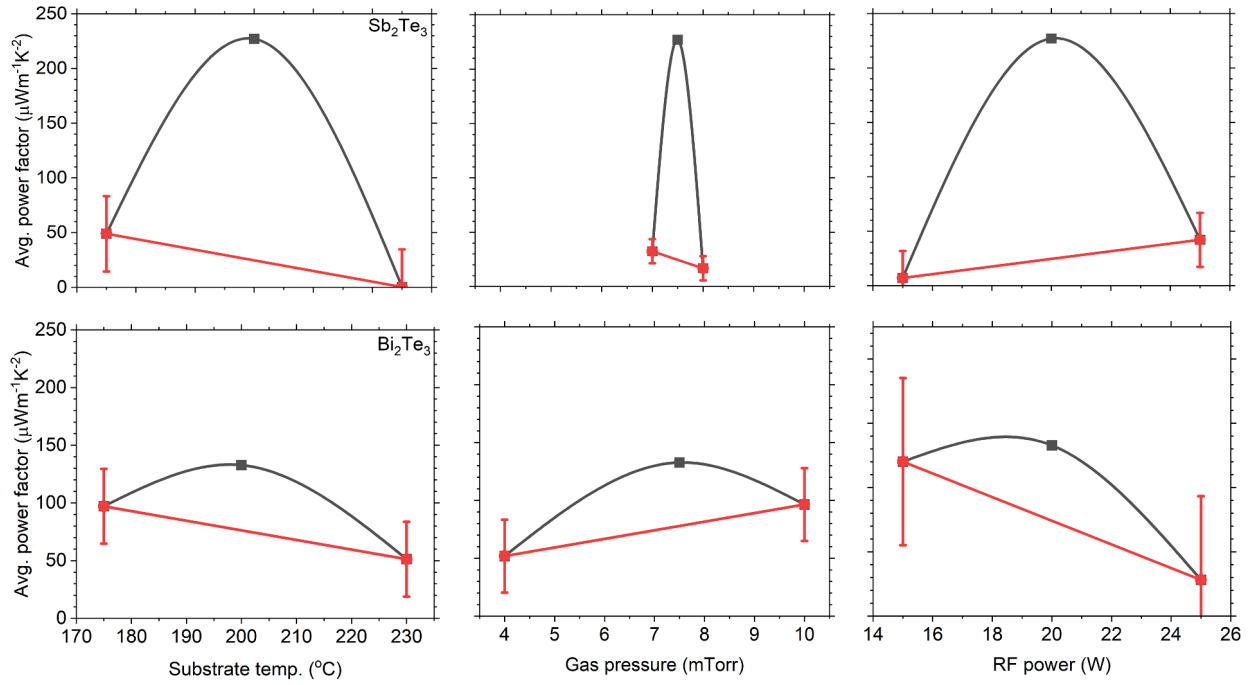


Figure 2. Main effect plots for Sb_2Te_3 (upper row) and Bi_2Te_3 (lower row).

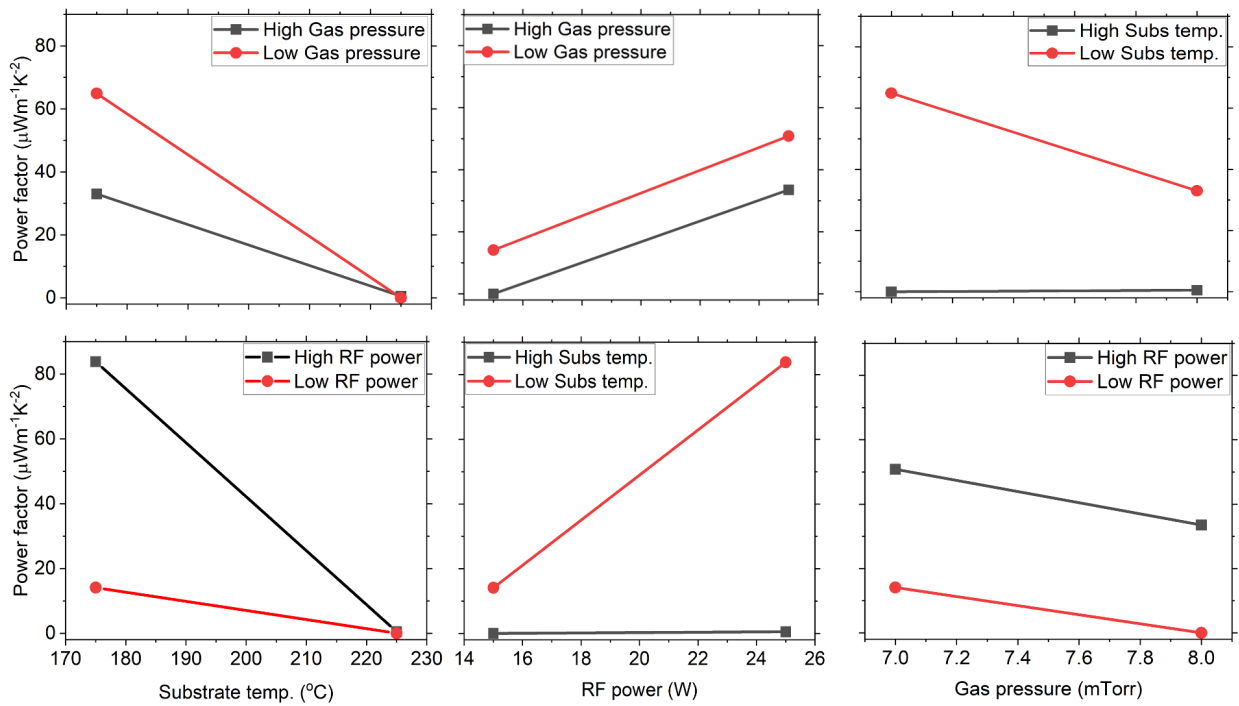


Figure 3. Interaction effects plots for Sb_2Te_3 .