Film properties In-situ Ar-annealing Plasma power (W)	Thickness (nm) & Index of refraction (@ 633 nm) MWE-Ellipsometer	Thickness (nm) & Index of refraction (@ 633 nm) Spec. Ellipsometer	Thickness (nm) XRR	Density (g/cm^3)	Roughness (nm)
100 W (w/o Ar-annealing)	33.48 1.93	34.12 1.97	30.93	3.13	2.76
50	25.12 1.70	27.82 1.70	23.87	3.04	0.88
100	33.03 1.74	35.67 1.76	31.41	2.91	1.68
150	59.38 1.96	66.75 1.95	60.80	3.14	3.89
200	42.20 1.98	44.88 1.94	40.77	2.94	1.18
250	45.09 2.05	51.17 2.06	43.30	3.11	0.58
300	46.05 2.09	54.48 2.10	43.80	3.03	0.81

Table I. Multi-wavelength ellipsometry (MWE), spectroscopic ellipsometry (SE), and x-ray reflection (XRR) extracted thickness, refractive index, density, and roughness of the films grown at 200 °C, 100 W with in-situ Ar-annealing rf-power scanned over 50 – 300 W.

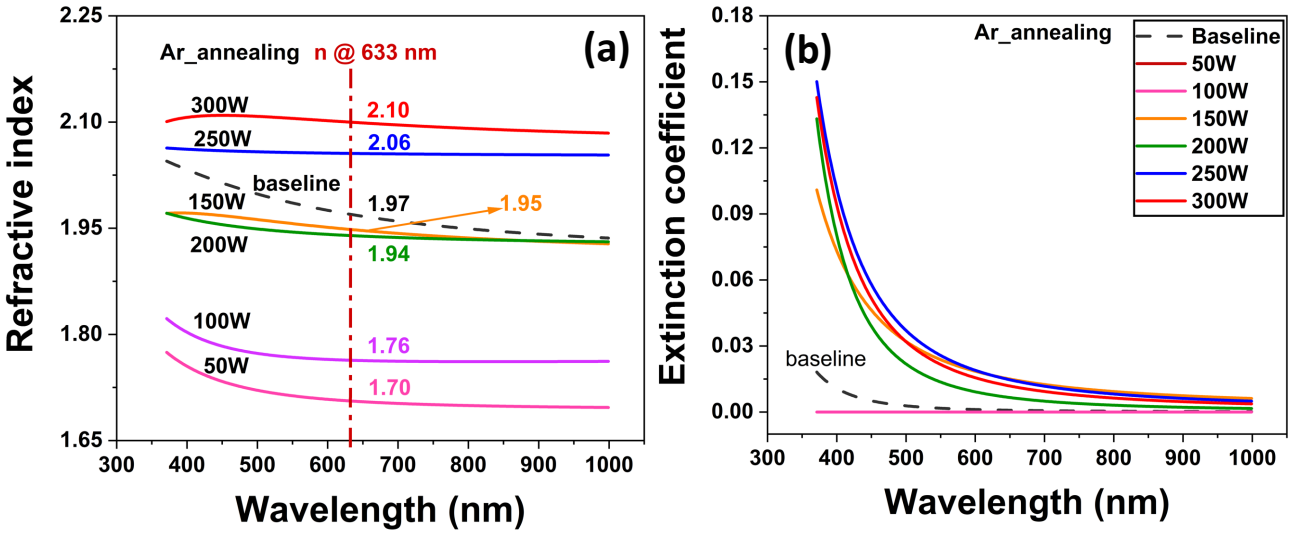

Figure 1. (a) Spectral refractive index of the films grown at 200 °C, 100 W with varying in-situ Ar-annealing plasma power. (b) Spectral extinction of the samples grown at 200 °C, 100 W with varying in-situ Ar-annealing rf-power. *Baseline* corresponds to the film grown at 200 °C, 100W without in-situ Ar-annealing.