

Supporting Information

Green Laser-Induced Graphene from Avocado Seed Waste: Process Optimization and Structural Defect Control

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Results and discussion

1.1.1. Influence of Scan Speed and Processing Flow

Table S1. Raman band intensities (I_D/I_G and I_{2D}/I_G) and positions (D, G, 2D) for samples obtained from grain size T-80 in an area of irradiation of $4.4 \pm 0.2 \text{ mm}^2$ with a laser power of 10% in argon flow of 5 L/min, and varying the scan speed.

Scanning Speed [mm s ⁻¹]	I_D/I_G	I_{2D}/I_G	D [cm ⁻¹]	G [cm ⁻¹]	2D [cm ⁻¹]
55	0.63 ± 0.46	0.59 ± 0.08	1352.13 ± 4	1585.37 ± 1	2698.87 ± 6
50	0.27 ± 0.15	0.54 ± 0.03	1353.77 ± 1	1585.63 ± 2	2703.3 ± 0.3
45	0.42 ± 0.24	0.57 ± 0.09	1350.14 ± 3	1583.65 ± 2	2698.74 ± 5
40	0.75 ± 0.11	0.53 ± 0.09	1351.97 ± 1	1586.47 ± 1	2701.22 ± 2

Table S2. Raman band intensities (I_D/I_G and I_{2D}/I_G) and positions (D, G, 2D) for samples obtained from grain size T-80 in an area of irradiation of $4.4 \pm 0.2 \text{ mm}^2$ with a laser power of 10% in argon flow of 5 L/min, and scanning speed of 50 mm s⁻¹ in comparison with reference [1], varying the atmosphere of synthesis.

Scanning Speed [mm s ⁻¹]	I_D/I_G	Scanning Speed [mm s ⁻¹]	I_{2D}/I_G
50	0.27 ± 0.1	50	0.54 ± 0.03
Ref [1]	0.81 ± 0.1	Ref [1]	0.73 ± 0.03
Ref [1]	0.71 ± 0.1	Ref [1]	0.76 ± 0.07

Table S3. Raman band intensities (I_D/I_G and I_{2D}/I_G) and positions (D, G, 2D) for samples obtained from varying the grain size and area of irradiation with a laser power of 10% in argon flow of 5 L/min, and scanning speed of 50 mm s⁻¹.

Sample		I_D/I_G	I_{2D}/I_G	$I_D/I_{D'}$	D	G	2D
					[cm ⁻¹]	[cm ⁻¹]	[cm ⁻¹]
T-80	9 mm ²	0.16 ± 0.04	0.52 ± 0.04	3.04 ± 0.34	1353 ± 0.1	1584 ± 0.4	2703 ± 0.7
	4 mm ²	0.23 ± 0.12	0.54 ± 0.12	2.86 ± 0.49	1354 ± 0.7	1585 ± 1.1	2703 ± 0.9
	1 mm ²	0.59 ± 0.30	0.46 ± 0.30	2.23 ± 0.50	1348 ± 4.7	1586 ± 0.2	2702 ± 1.9
T-140	9 mm ²	0.21 ± 0.08	0.52 ± 0.08	2.85 ± 0.98	1353 ± 1.9	1585 ± 0.8	2704 ± 1.0
	4 mm ²	0.42 ± 0.17	0.56 ± 0.17	3.18 ± 0.14	1352 ± 0.2	1586 ± 0.5	2703 ± 1.1
	1 mm ²	0.72 ± 0.31	0.52 ± 0.31	3.36 ± 0.54	1347 ± 4.6	1585 ± 0.8	2695 ± 7.5
T - 270	9 mm ²	0.27 ± 0.03	0.53 ± 0.03	2.67 ± 0.60	1352 ± 2.0	1585 ± 1.2	2703 ± 0.7
	4 mm ²	0.44 ± 0.21	0.60 ± 0.21	3.52 ± 0.17	1350 ± 1.9	1584 ± 0.5	2698 ± 4.5
	1 mm ²	1.29 ± 0.45	0.56 ± 0.45	3.91 ± 0.56	1346 ± 2.2	1587 ± 3.0	2687 ± 4.4

Table S4. Raman band intensities (I_D/I_G and I_{2D}/I_G) and positions (D, G, 2D) for samples reproducibility obtained from T-80 grain size, area of irradiation of 56.4 ± 3 mm² with a laser power of 11%, and scanning speed of 50 mm s⁻¹.

Scanning Speed	I_D/I_G	I_{2D}/I_G	D	G	2D
[mm s ⁻¹]			[cm ⁻¹]	[cm ⁻¹]	[cm ⁻¹]
Sample 1	0.24	0.51	1353.77	1585.99	2703.83
	0.08	0.37	1353.77	1584.86	2704.31
	0.09	0.45	1353.42	1584.75	2703.83
Sample 2	0.11	0.45	1353.58	1584.99	2703.51
	0.12	0.41	1354.12	1584.90	2704.15
	0.24	0.54	1354.41	1585.01	2704.15
Sample 3	0.14	0.46	1353.28	1584.37	2703.17
	0.14	0.55	1354.58	1586.41	2704.93
	0.17	0.46	1353.65	1584.41	2704.04
Sample 4	0.12	0.47	1354.35	1585.09	2703.95
	0.18	0.57	1354.09	1585.18	2703.02
	0.26	0.59	1353.6	1585.91	2703.71
Sample 5	0.12	0.43	1354.38	1586.00	2704.86
	0.06	0.36	1354.19	1584.26	2703.86
	0.16	0.53	1354.19	1585.15	2703.43

Reference

[1] Li, Y. *et al.* Laser-Induced Graphene in Controlled Atmospheres: From Superhydrophilic to Superhydrophobic Surfaces. *Advanced Materials* **29**, 1700496 (2017).