# Mechanical Transfer of Black Phosphorous on Silk Fibroin Substrate: a Viable Method for Photo-Responsive and Printable Biomaterials

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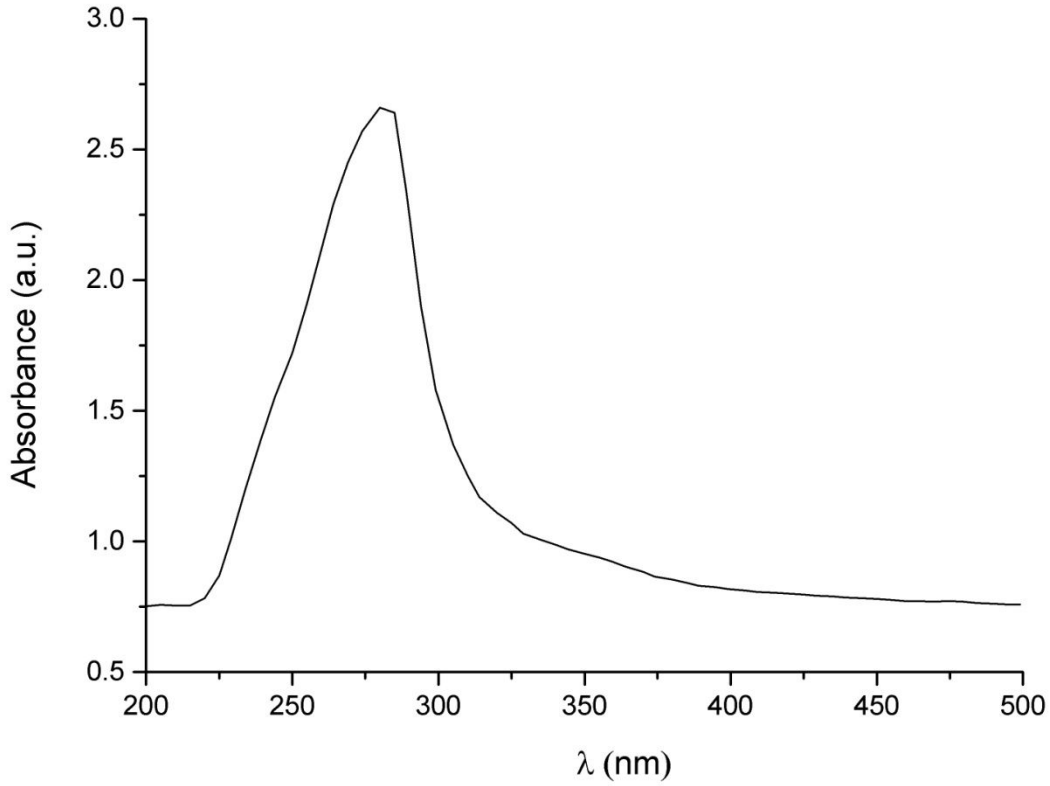


**Figure S1.** UV-Vis absorption spectrum of PS Petri dish cap.

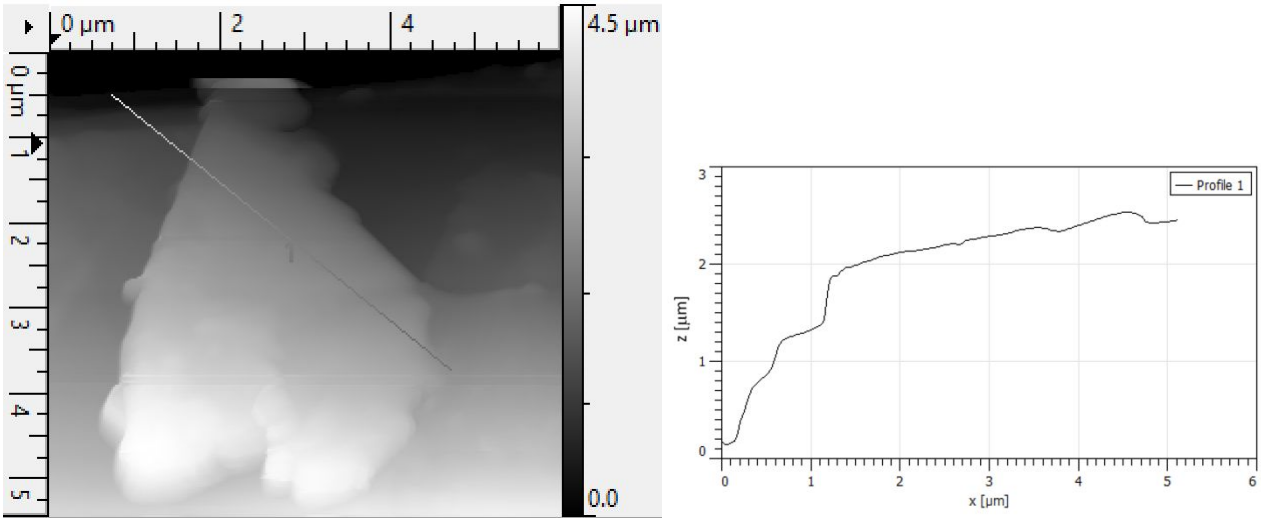


**Figure S2.** Representative atomic force microscopic (AFM) images showing the topography of bulk BP flakes glued on mica substrate before the mechanical exfoliation.

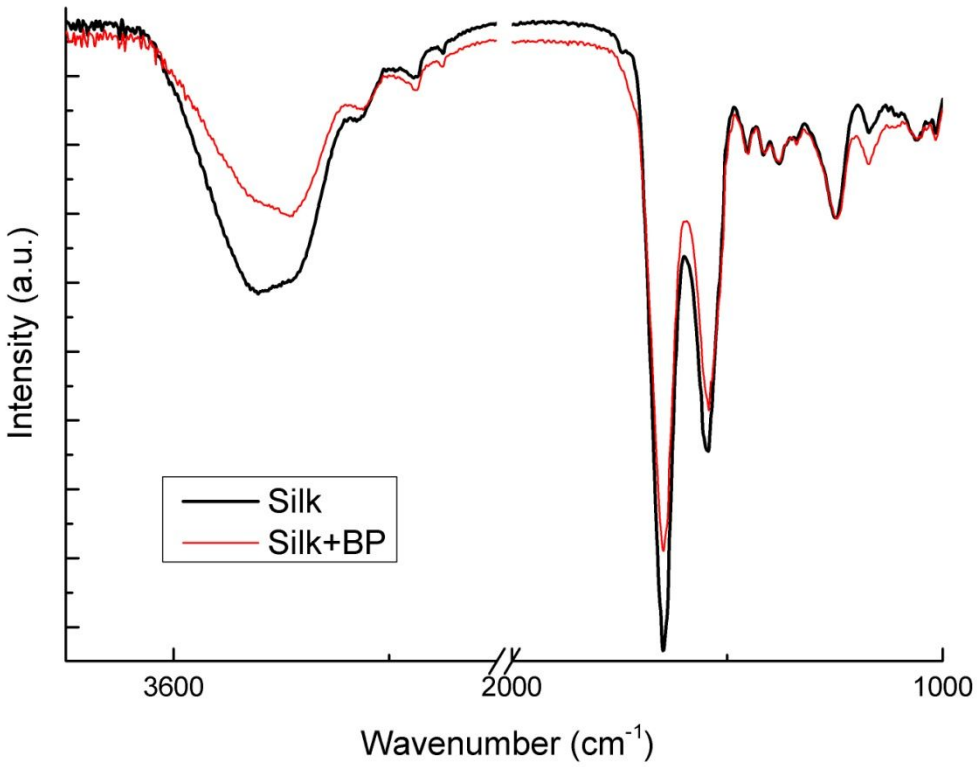


**Figure S3.** ATR-FTIR spectra of SF and SF/BP films.

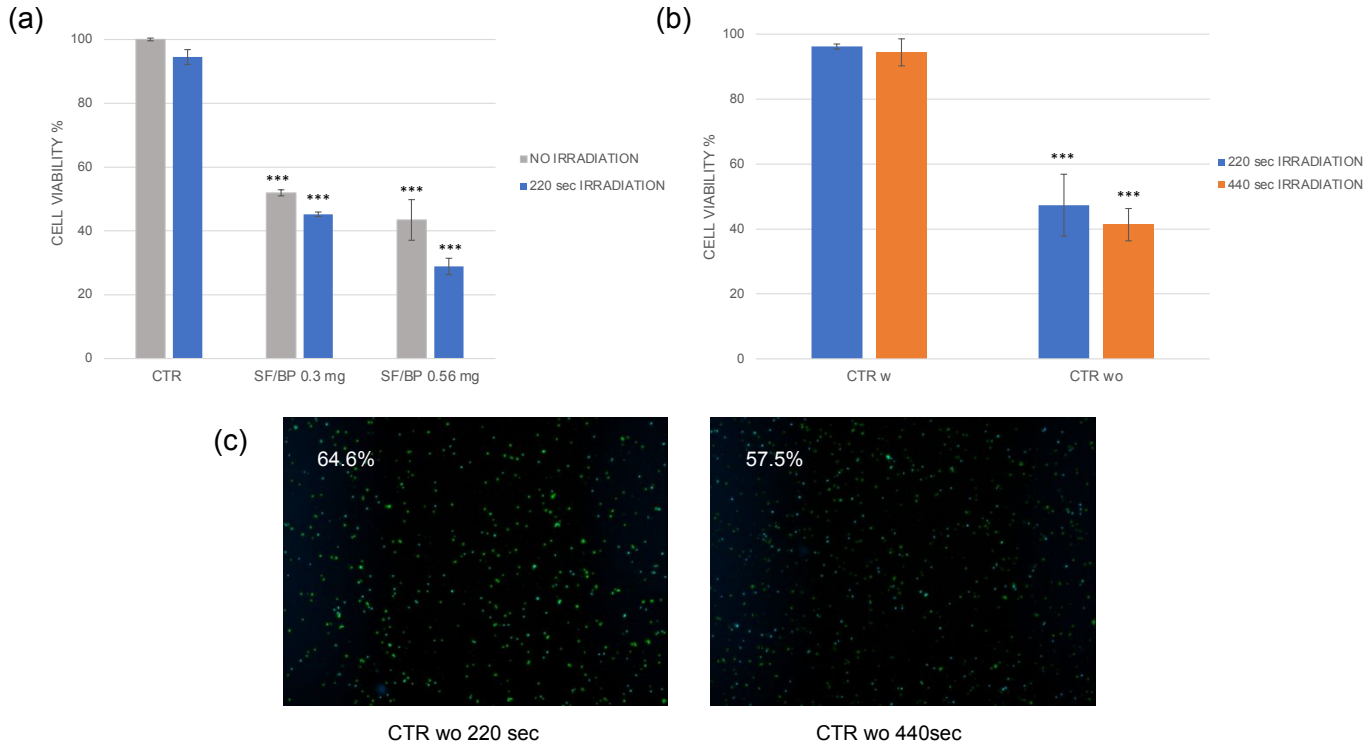


**Figure S4.** (a) Viability after 24h of MCF7 cancer cells after incubation with PBS 1X (CTR), SF/BP 0.3 mg, SF/BP 0.56 mg were reported without irradiation (in grey), irradiated with 110 kJ/m2 dose for 220 sec (in blue). (b) Viability after 24h of MCF7 cancer cells after incubation with PBS 1X (CTR) with cover (CTR w) and without cover (CTR wo) were reported after irradiation with 110 kJ/m$^2$ dose for 220 sec (in blue) and after irradiation with 220 kJ/m$^2$ dose for 440 sec (in orange). (c) AO-DAPI double staining was also performed for cells without cover (wo) and viability (%) was reported in each image.

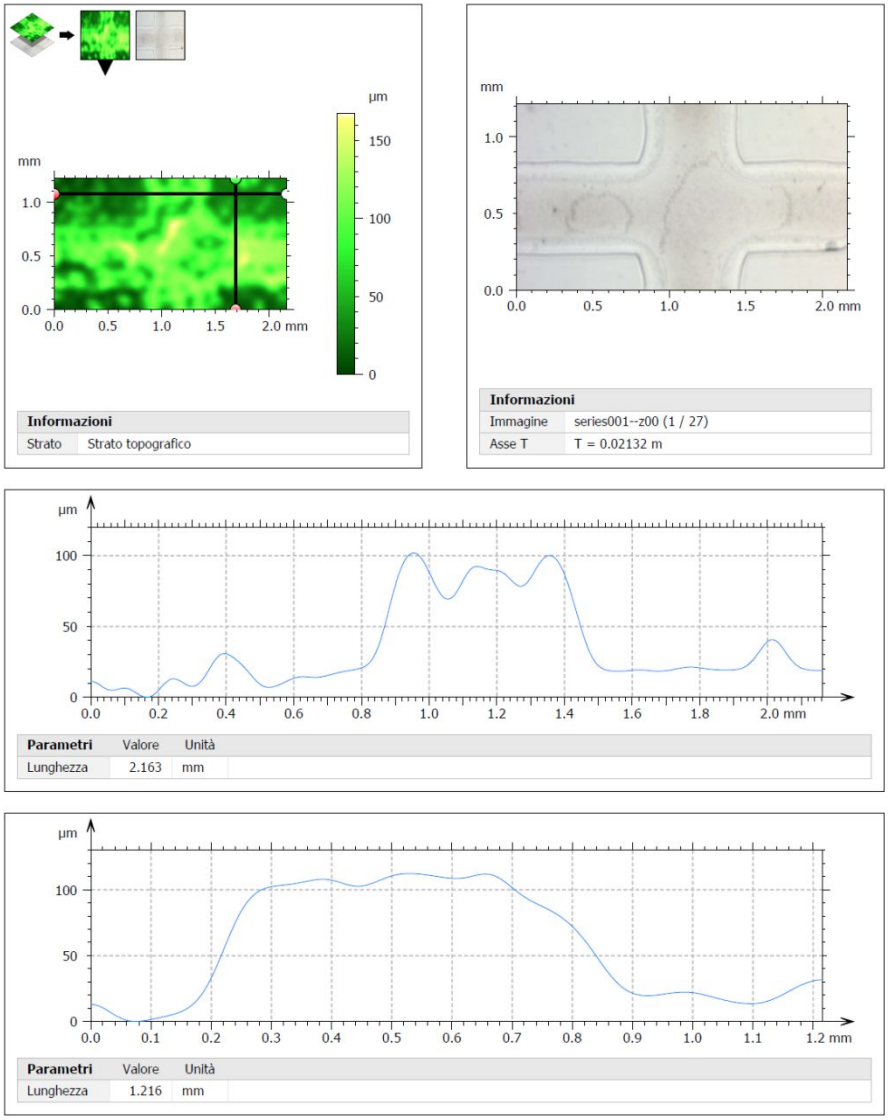


**Figure S5:** line profile extraction of the SF solution performed by the Leica Map CDM Software.

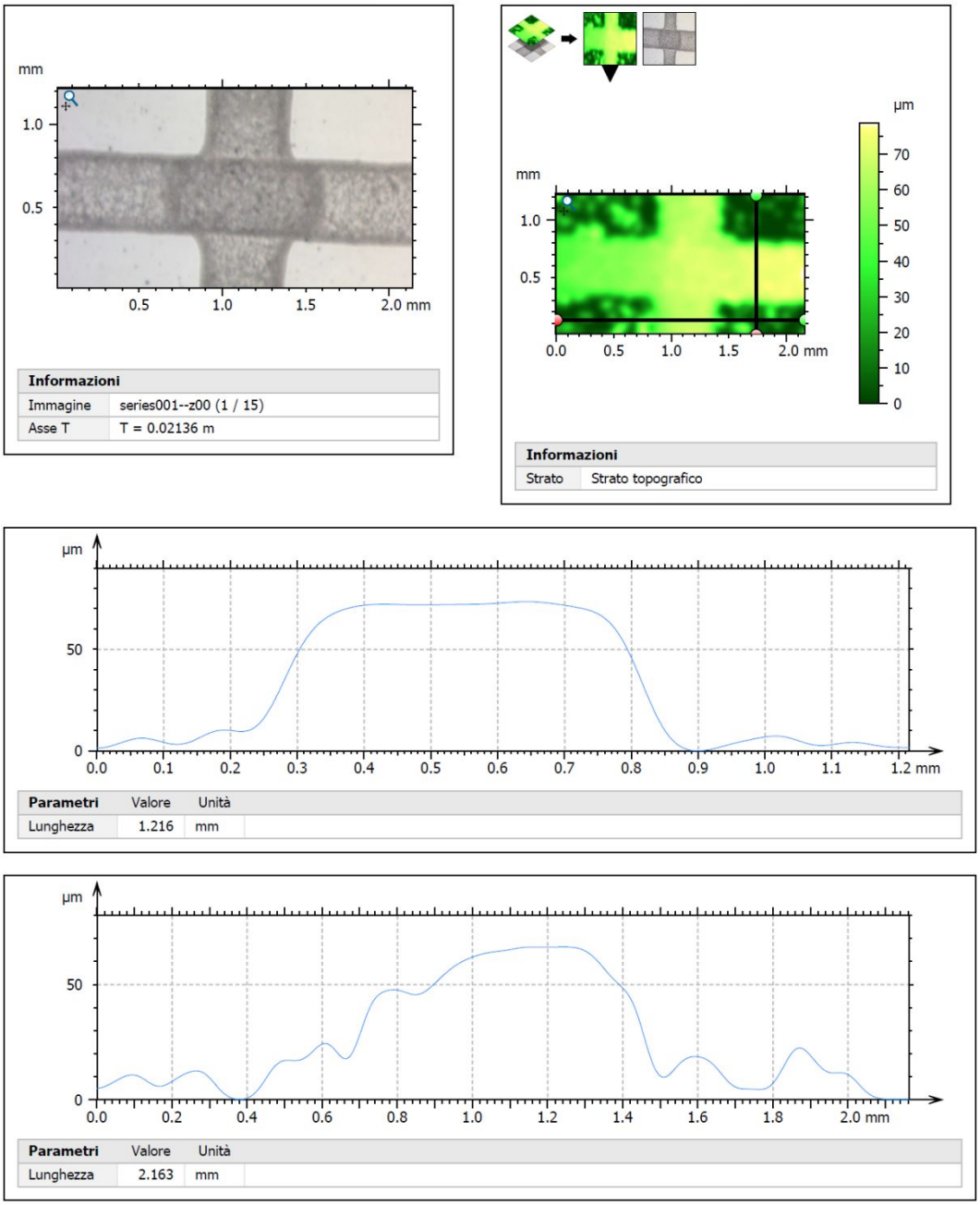


**Figure S6:** line profile extraction of the SF/BP solution performed by the Leica Map CDM Software.

**Table S1.** Viability (%), live cells (cells/ml), dead cells (cells/ml), total number of cells (cells/ml) and estimated cell diameter (μm) were reported for each treatment using Acridine Orange-DAPI double staining assay. Samples were highlighted as follow: negative control in PBS 1X (in grey), positive control without cover in PBS 1X (in red), SF (in yellow), SF/BP 0.03 mg (in light blue), SF/BP 0.056 mg (in green) and BP 0.056 mg (in fuchsia).

| Samples | Viability (%) | Live (cells/ml) | Dead (cells/ml) | Total (cells/ml) | Estimated cell diameter (um) |
|---|---|---|---|---|---|
| **CTR** | 90.6 | 2.61E+06 | 3.82E+05 | 2.99E+06 | 19.2 |
| **CTR 220 sec** | 86.2 | 1.82E+06 | 2.92E+05 | 2.11E+06 | 19.3 |
| **CTR 440sec** | 83.2 | 1.91E+06 | 3.83E+05 | 2.29E+06 | 19.0 |
| **CTR wo 220sec** | 64.6 | 9.05E+05 | 3.08E+05 | 1.21E+06 | 18.5 |
| **CTR wo 440sec** | 57.5 | 5.50E+05 | 2.65E+05 | 8.15E+05 | 17.1 |
| **SF** | 86.7 | 1.72E+06 | 2.64E+05 | 1.98E+06 | 19.4 |
| **SF 220 sec** | 80.5 | 2.10E+06 | 5.21E+05 | 2.62E+06 | 18.9 |
| **SF 440 sec** | 85.3 | 1.56E+06 | 2.70E+05 | 1.83E+06 | 18.2 |
| **SF/BP 0.03mg** | 89.1 | 2.45E+06 | 3.00E+05 | 2.75E+06 | 19.4 |
| **SF/BP 0.03mg 220 sec** | 73.6 | 7.49E+05 | 2,69E+05 | 1.02E+06 | 18.3 |
| **SF/BP 0.03mg 440 sec** | 68.7 | 5.43E+05 | 2.47E+05 | 7.90E+05 | 17.9 |
| **SF/BP 0.056 mg** | 84.2 | 1.92E+06 | 3.59E+05 | 2.28E+06 | 19.4 |
| **SF/BP 0.056 mg 220 sec** | 76.5 | 1.03E+06 | 3.17E+05 | 1.35E+06 | 18.7 |
| **SF/BP 0.056 mg 440 sec** | 72.2 | 1.05E+06 | 4.05E+05 | 1.46E+06 | 19.0 |
| **BP 0.056 mg** | 80.9 | 1.37E+06 | 3.23E+05 | 1.69E+06 | 18.9 |
| **BP 0.056 mg 220 sec** | 70.5 | 8.92E+05 | 3.74E+05 | 1.27E+06 | 19.5 |
| **BP 0.056 mg 440 sec** | 52.8 | 4.85E+05 | 4.33E+05 | 9.18E+05 | 17.1 |