

Table S1. Tensile properties of PAA-16DGE-NFC-RGO filaments

| <b>Material</b> | <b>Initial Modulus (MPa)</b> | <b>Elastic Modulus (MPa)</b> | <b>Tensile Strength (MPa)</b> | <b>Elongation (%)</b> | <b>Work-to-break (MJ·m<sup>-3</sup>)</b> |
|-----------------|------------------------------|------------------------------|-------------------------------|-----------------------|--|
| PAA-16DGE       | 2.1 ± 0.8                    | 3.9 ± 1.6                    | 3.9 ± 2.0                     | 413 ± 34.6            | 986.3 ± 30.3                             |
| PAA-16DGE-NFC   | 12.3 ± 3.4                   | 23.8 ± 6.3                   | 20.8 ± 6.3                    | 135.4 ± 15.4          | 1870.0 ± 36.1                            |
| <b>'Dry'</b>    |                              |                              |                               |                       |  |
| PF11-2.5        | 4.7 ± 1.2                    | 16.5 ± 5.4                   | 45.5 ± 15.1                   | 488 ± 15.3            | 9235.2 ± 47.1                            |
| PF11-5          | 6.0 ± 0.7                    | 25.4 ± 3.9                   | 40.2 ± 10.4                   | 258 ± 19.8            | 3660.0 ± 39.2                            |
| PF31-2.5        | 49.3 ± 8.3                   | 1543.2 ± 27.2                | 55.1 ± 8.6                    | 37 ± 8.0              | 405.8 ± 22.5                             |
| PF31-5          | 189.4 ± 13.7                 | 1051.6 ± 15.5                | 111.0 ± 12.5                  | 23 ± 5.2              | 1090.5 ± 34.0                            |
| <b>'Wet'</b>    |                              |                              |                               |                       |  |
| PF11-2.5        | 16.6 ± 6.0                   | 22.9 ± 6.7                   | 20.9 ± 11.4                   | 151 ± 21.1            | 1870.3 ± 60.9                            |
| PF11-5          | 24.0 ± 9.6                   | 44.8 ± 10.2                  | 32.0 ± 9.7                    | 103 ± 14.1            | 1561.3 ± 49.4                            |
| PF31-2.5        | 31.2 ± 8.2                   | 424.4 ± 35.0                 | 35.8 ± 7.2                    | 27 ± 11.3             | 241.8 ± 26.7                             |
| PF31-5          | 38.5 ± 11.4                  | 620.0 ± 51.1                 | 40.2 ± 10.3                   | 21 ± 9.4              | 362.8 ± 32.1                             |