

Supporting information

Thermal Diffusivity Modulation Driven by the Interfacial Elastic Dynamics Between Cellulose Nanofibers

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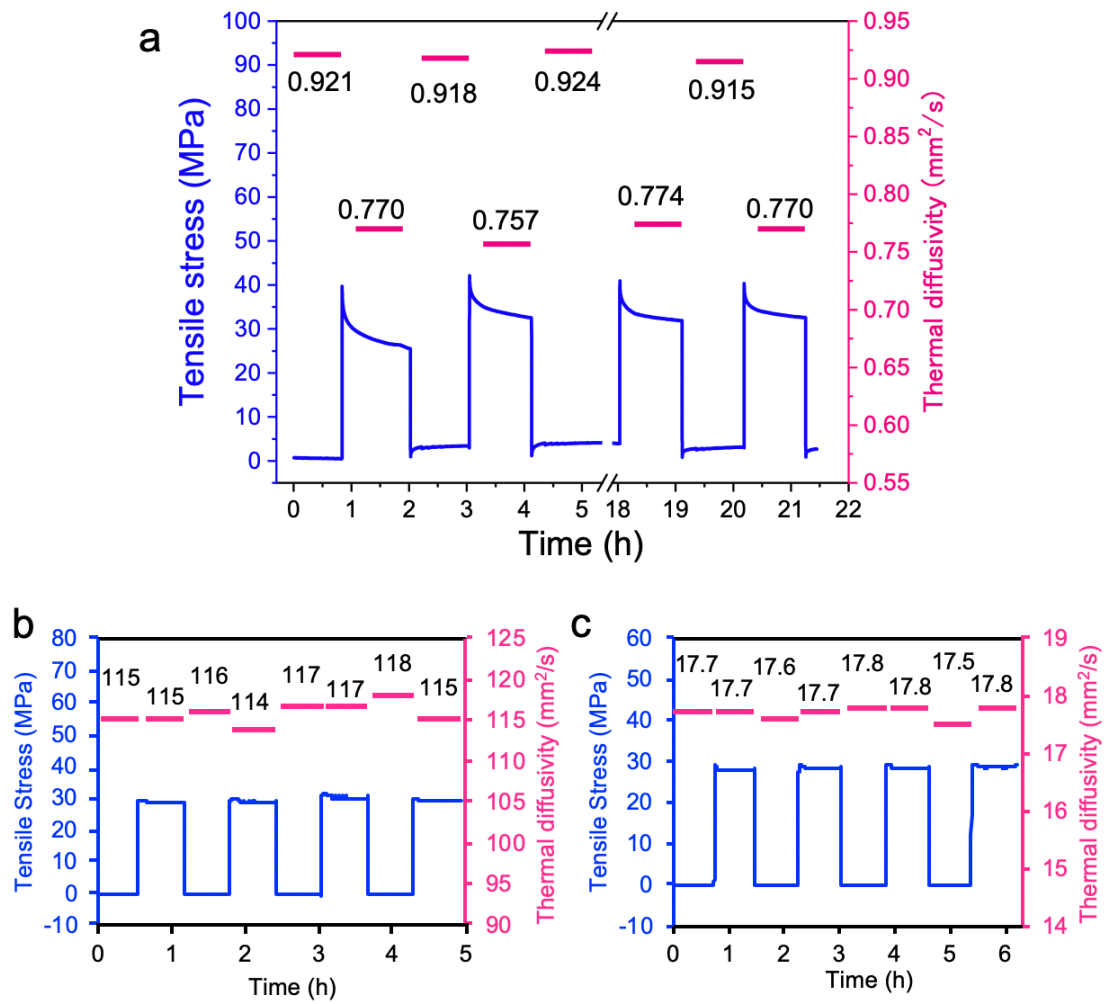


Figure S1. The measured thermal diffusivity values for the CNF film (a), copper (b) and (c) iron plates, shown in Figure 1.

Table S1. Variability evaluation of repetitive measuring thermal diffusivity at the same point in a single CNF film.

| | In-plane thermal diffusivity (mm ² /s) | Through-plane thermal diffusivity (mm ² /s) |
|-----------------|---|--|
| No.1 | 1.26 | 0.226 |
| No.2 | 1.20 | 0.227 |
| No.3 | 1.24 | 0.219 |
| No.4 | 1.18 | 0.221 |
| No.5 | 1.21 | 0.221 |
| Average | 1.218 | 0.2228 |
| SD | 0.029 | 0.0031 |
| Relative SD (%) | 2.345 | 1.402 |

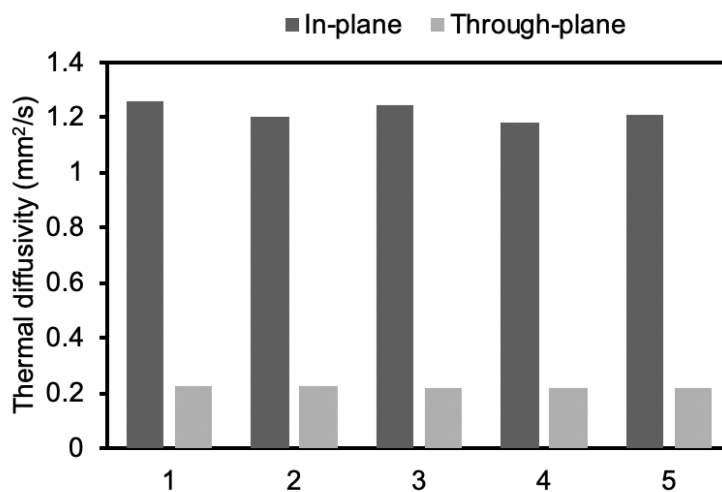


Figure S2. Visualization of Table S1.

Table S2. Variability evaluation of measuring thermal diffusivity at the 5 different points within a single CNF film.

| | In-plane thermal diffusivity (mm ² /s) | Through-plane thermal diffusivity (mm ² /s) |
|-----------------|---|--|
| No.1 | 1.17 | 0.17 |
| No.2 | 1.17 | 0.144 |
| No.3 | 1.16 | 0.157 |
| No.4 | 1.19 | 0.153 |
| No.5 | 1.19 | 0.153 |
| Average | 1.176 | 0.1554 |
| SD | 0.012 | 0.0085 |
| Relative SD (%) | 1.020 | 5.439 |

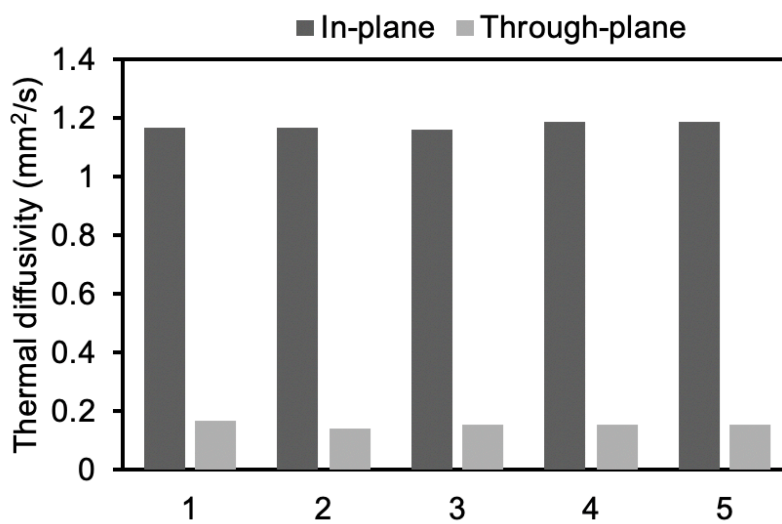


Figure S3. Visualization of Table S2.

Table S3. Variability evaluation of measuring thermal diffusivity on the 10 different CNF films.

| | In-plane thermal diffusivity (mm ² /s) | Through-plane thermal diffusivity (mm ² /s) |
|-----------------|---|--|
| No.1 | 1.01 | 0.205 |
| No.2 | 0.909 | 0.179 |
| No.3 | 0.805 | 0.172 |
| No.4 | 0.926 | 0.131 |
| No.5 | 0.895 | 0.115 |
| No.6 | 1.25 | 0.25 |
| No.7 | 1.11 | 0.243 |
| No.8 | 1.18 | 0.183 |
| No.9 | 1.35 | 0.144 |
| No.10 | 1.23 | 0.123 |
| Average | 1.067 | 0.175 |
| SD | 0.174 | 0.0452 |
| Relative SD (%) | 16.270 | 25.906 |

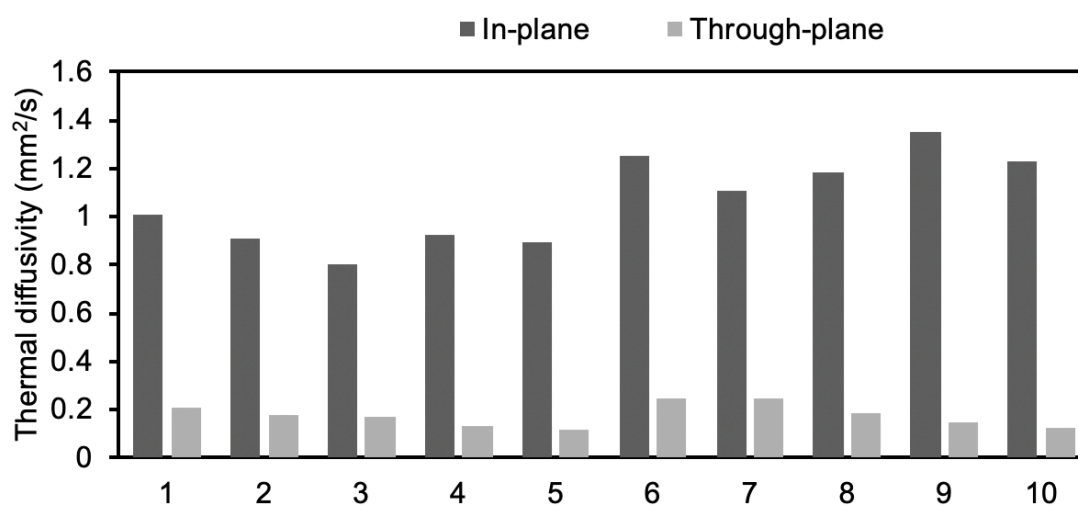


Figure S4. Visualization of Table S3.

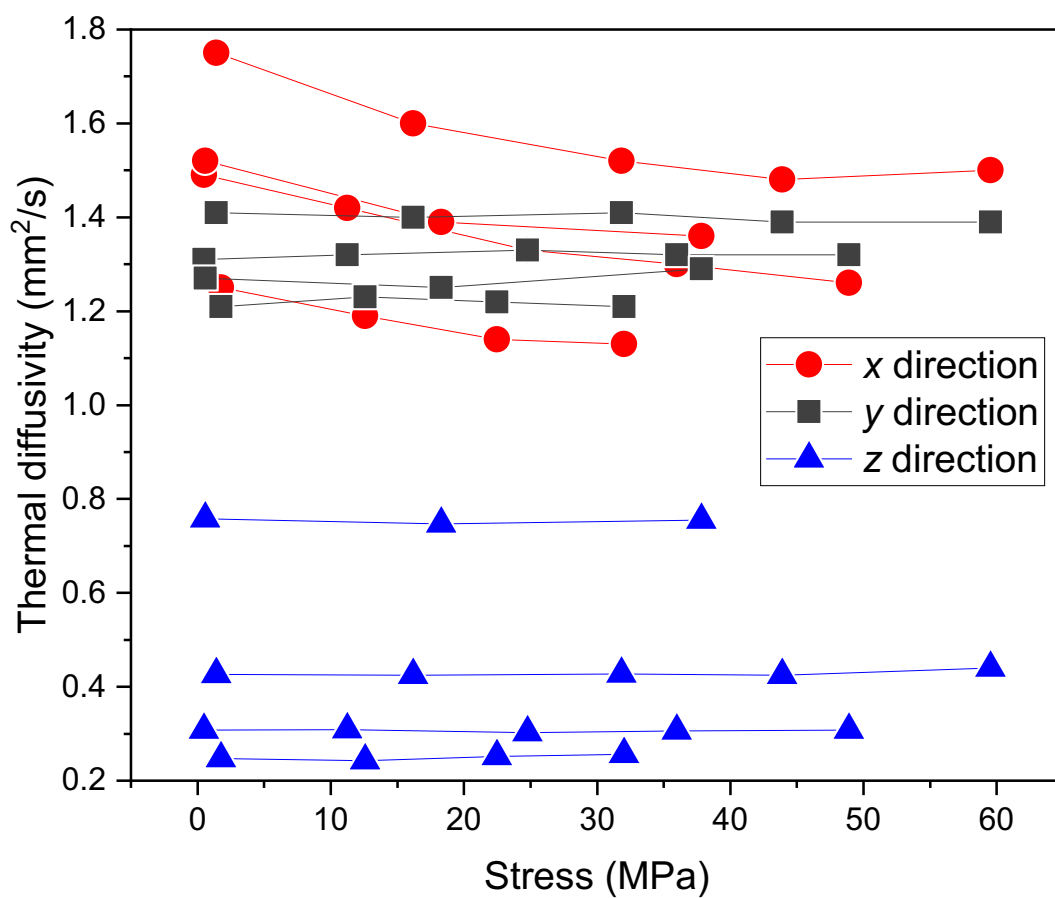


Figure S5. The measured thermal diffusivities for four CNF films shown in Figure 2c.

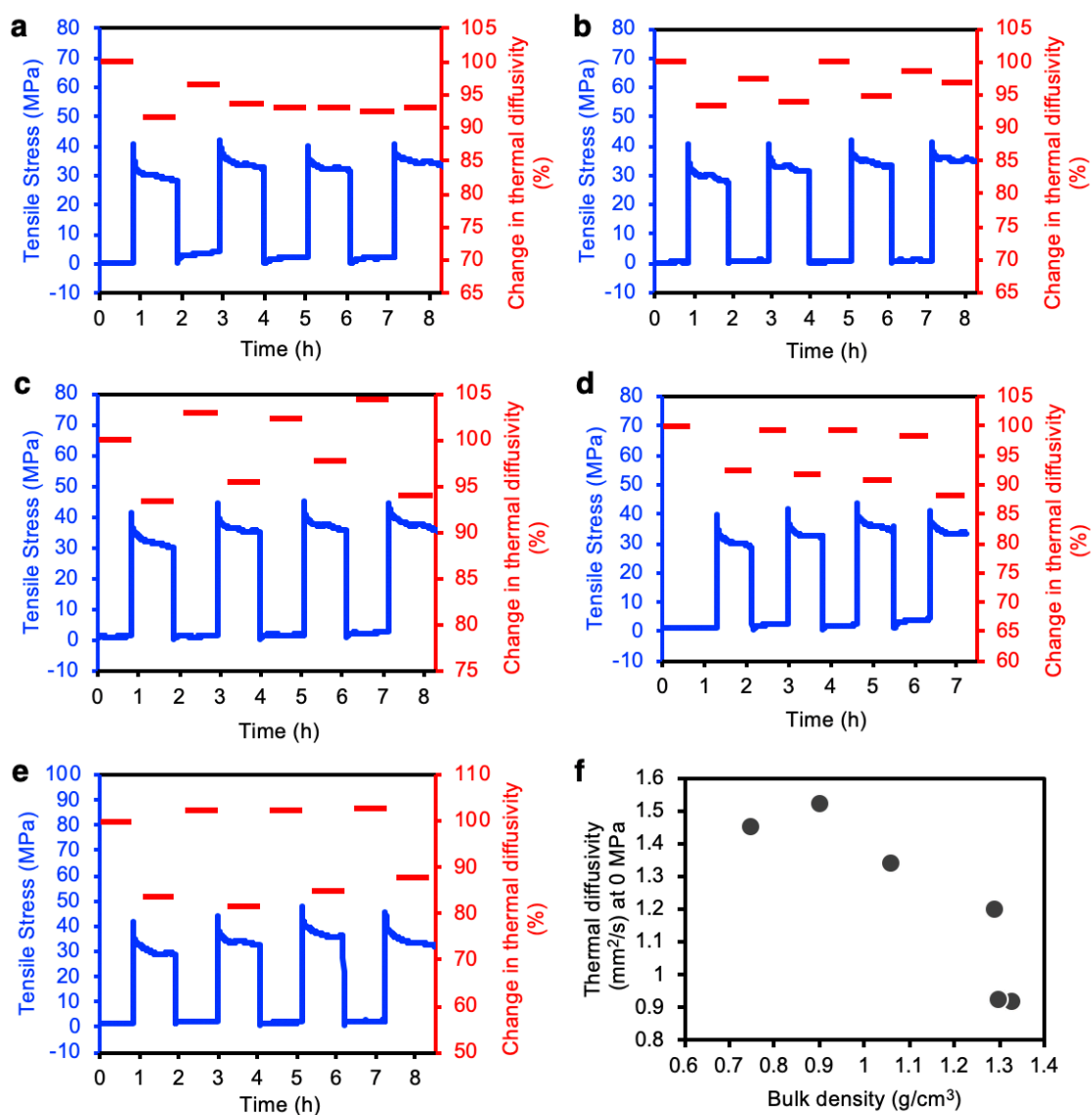


Figure S6. Thermal diffusivity modulation behaviors for CNF films with different bulk density of (a) 0.751, (b) 0.901, (c) 1.06, (d) 1.29, and (e) 1.33 g/cm³. (f) The original thermal diffusivity for each films before applying stress varied inversely to the bulk density.