***Supporting Information***

**Table S1.** XPS results of the residual char

|  |  |  |
| --- | --- | --- |
| **System** | **Binding energy (eV)** | **Atom (%)** |
| *Free burning* |  |  |
| C1s | 284.7, 285.5, 287.9 | 89 |
| O1S | 531.8, 532.8 | 11 |
| *Water* |  |  |
| C1s | 284.7, 285.5, 287.9 | 92.2 |
| O1S | 531.8, 532.8 | 7.8 |
| *Hybrid gel* |  |  |
| C1s | 284.7, 285.5, 287.9, 285.2 | 87.2 |
| O1S | 531.8, 532.8 | 12.5 |
| P2p | 133.9, 135.1 | 0.4 |

**Table S2.** XPS C1s peak contents of residual char

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **System** | **C-C/C-H** | **C-O** | **C=O** | **P-C** |
| *Free burning* | 33.3 | 47.2 | 19.5 | 0 |
| *Water* | 69.3 | 23.5 | 7.2 | 0 |
| *Hybrid gel* | 24.0 | 16.2 | 13.9 | 45.9 |