

Supporting Information for:

Synergistic effect of phosphorus-nitrogen and silicon-containing chain extenders on the mechanical property, flame retardancy and thermal degradation behavior of waterborne polyurethane

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Table S1. Composition and LOI values of FRWPU post-chain extended by KH-602.

| Sample ^a | Theoretical composition (g) | | | | | | | LOI (%) |
|---------------------|-----------------------------|---------|------|-----|------|------------------|--------|------------|
| | H ₁₂ MDI | PPG2000 | DMPA | NPG | TEA | H ₂ O | KH-602 | |
| WPU | 23 | 30 | 2.9 | 3.0 | 2.19 | 110 | 0 | 18.4 ± 0.2 |
| FRWPU-0.3 | 23 | 30 | 2.9 | 3.0 | 2.19 | 110 | 1.38 | 18.5 ± 0.1 |
| FRWPU-0.6 | 23 | 30 | 2.9 | 3.0 | 2.19 | 110 | 2.76 | 18.6 ± 0.2 |

^a The post-chain extension ratios of KH-602 for FRWPU were 30% and 60%, respectively.

In Table S1, it can be seen that WPU has a LOI value of 18.4%, showing a poor flame retardancy. After post-chain extended by KH-602, the LOI values of FRWPU insignificantly improve to 18.5% and 18.6%, respectively, which are still very combustible, suggesting that the low concentration of silicon element cannot effectively bestow polyurethane with flame retardant effect.