

Synergistic Flame-retardant Coatings for Flexible Polyurethane Foam According to Sol-Gel Technology Based on Montmorillonite and AP

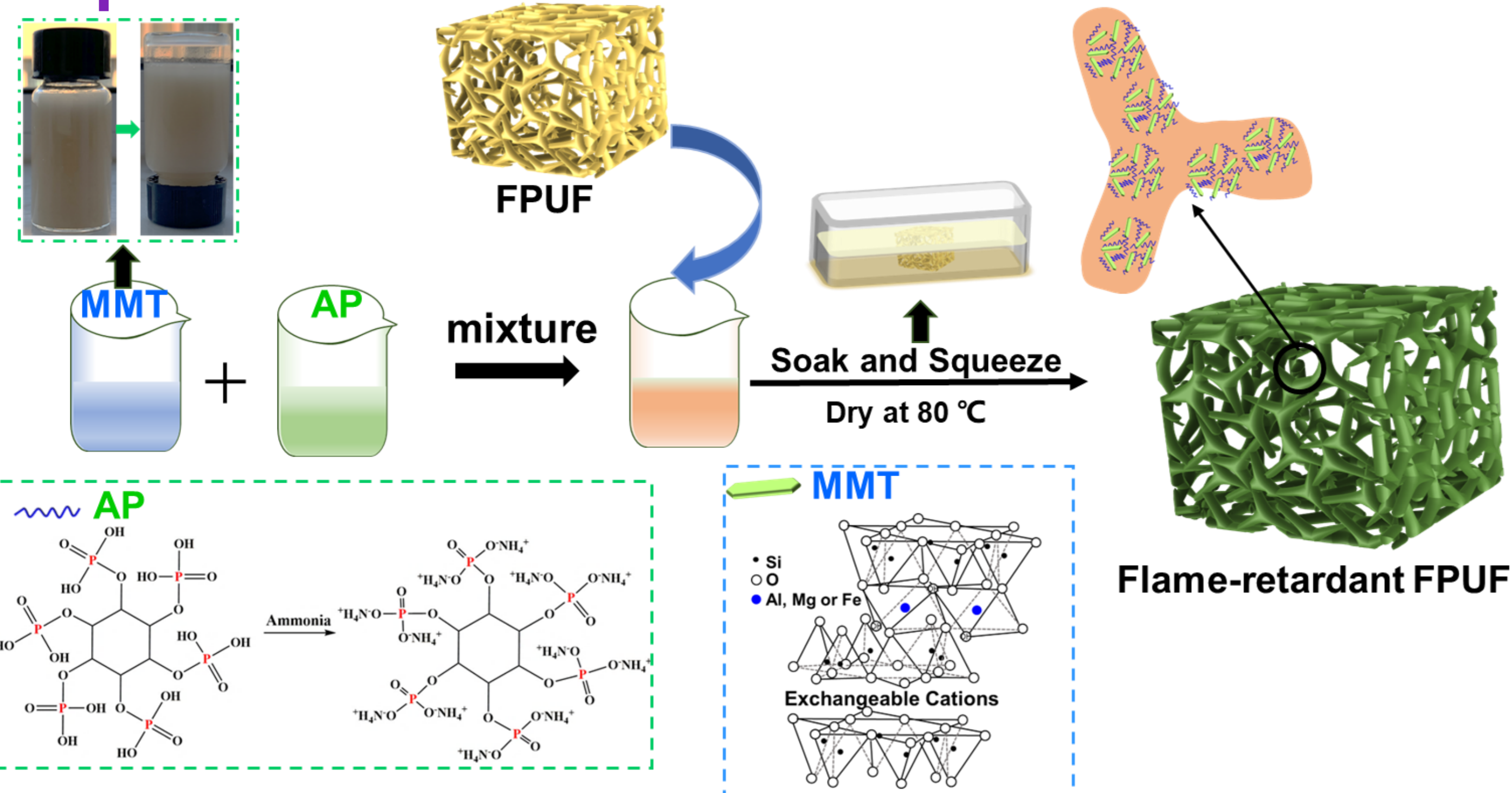
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Background

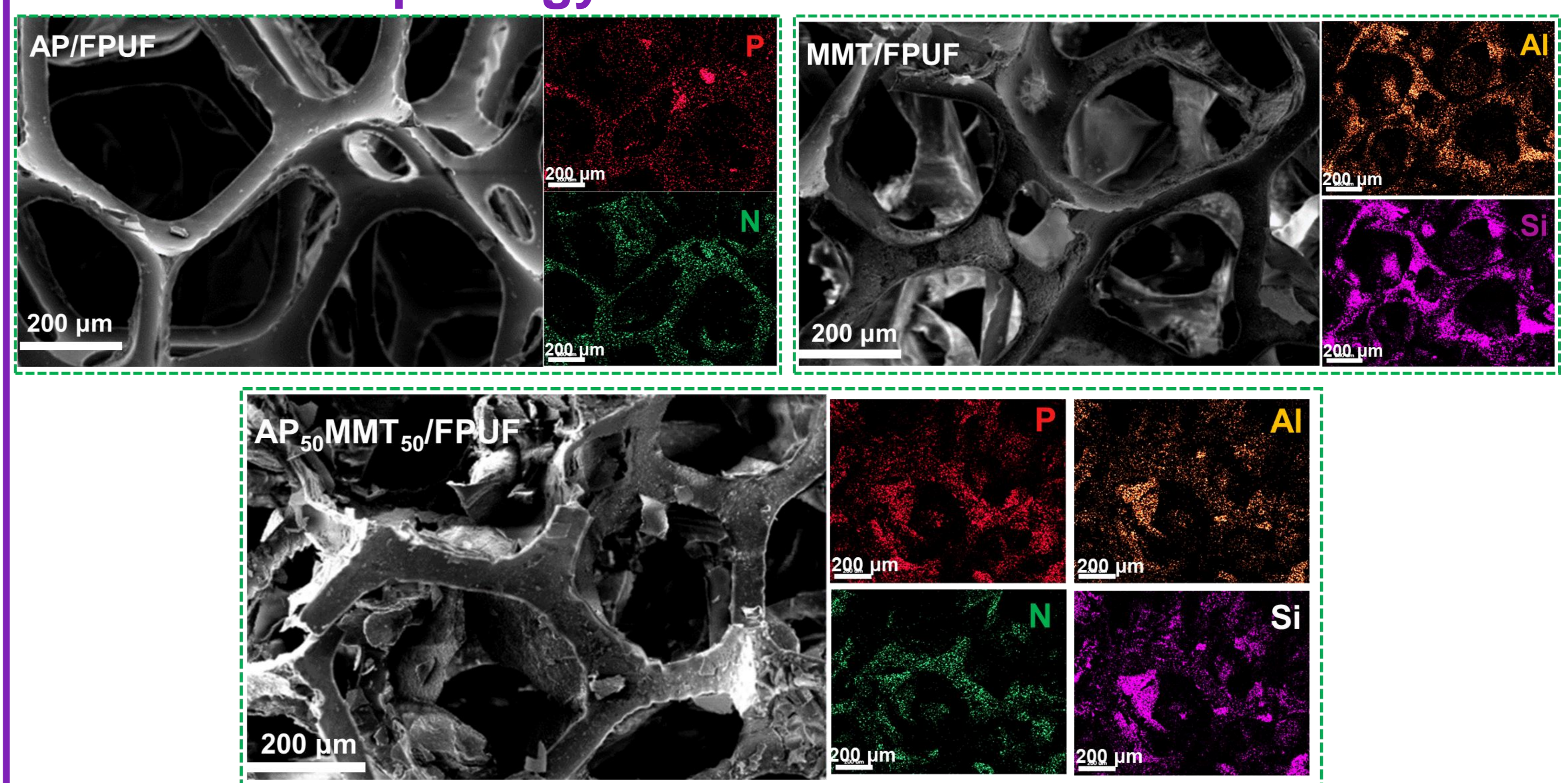
Flexible polyurethane foam (FPUF) has several great properties, such as sound insulation, high resilience, and permeability due to the fluffy and open-cell structure. FPUF is recognized as one of the widely used industrial materials, and the applications contain furniture, mattress, transportation seat, and packaging. However, FPUF exhibits serious flammability and toxic substance release resulting from the special structure as well as an organic constituent. Nowadays, some synthetic flame retardants for FPUF have gradually exposed the serious environmental pollution problems and threatened the health of human beings.

Preparation

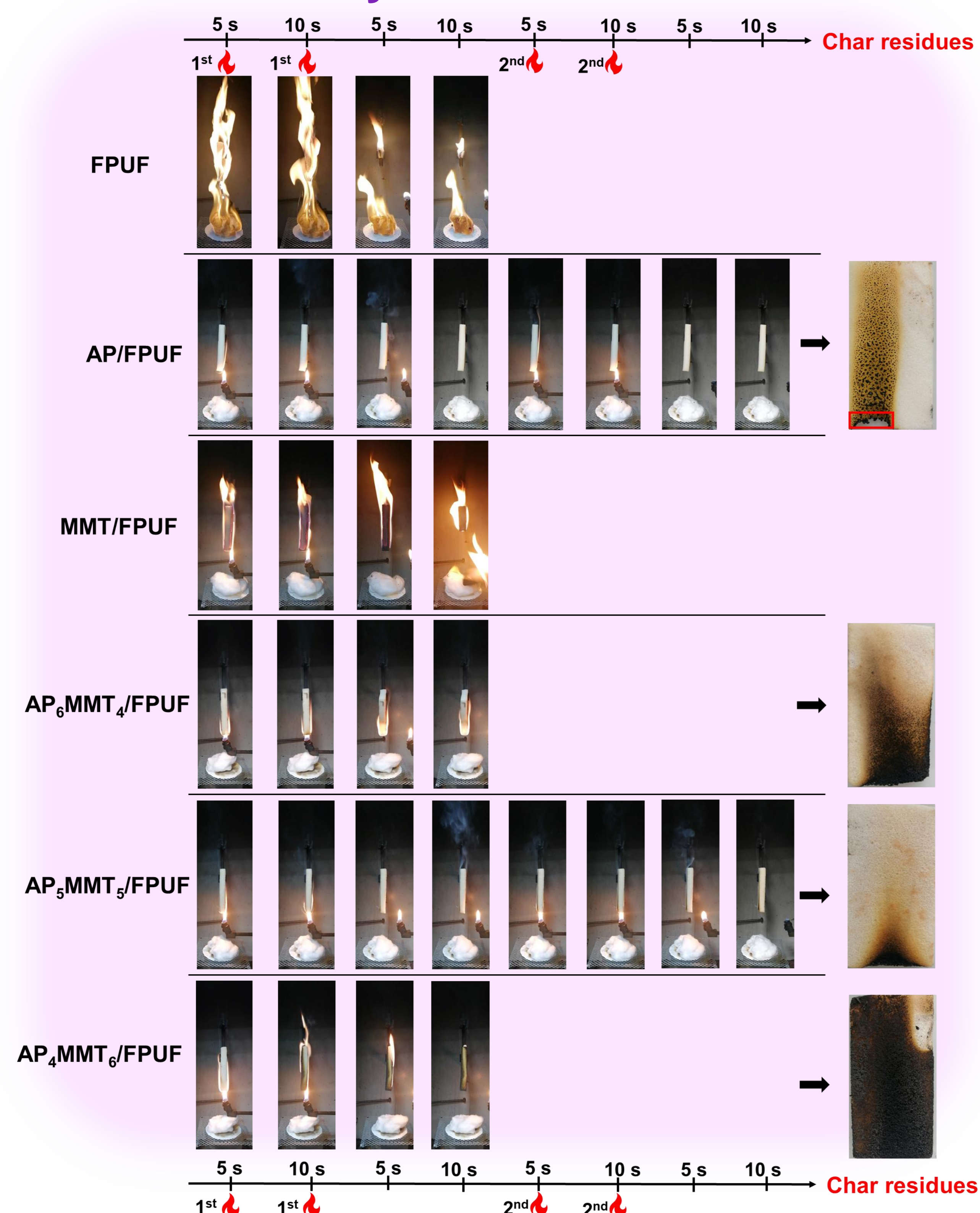


Eco-friendly coatings comprised of ammonium phytate (AP) and montmorillonite (MMT) were fabricated to improve the flame retardancy of FPUF through sample sol-gel technology.

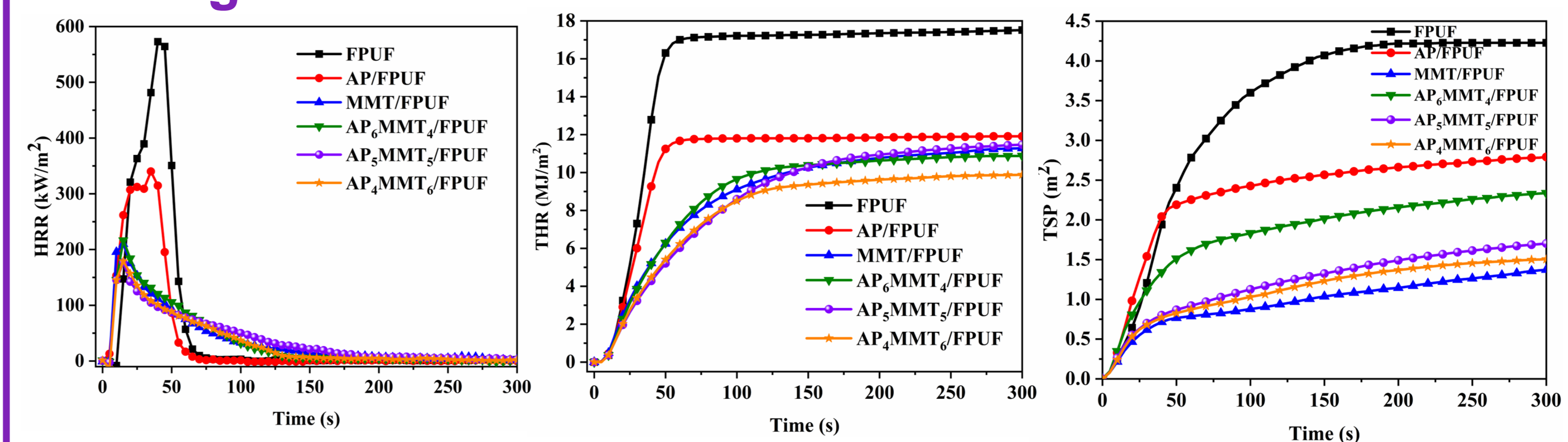
The micromorphology and element distribution



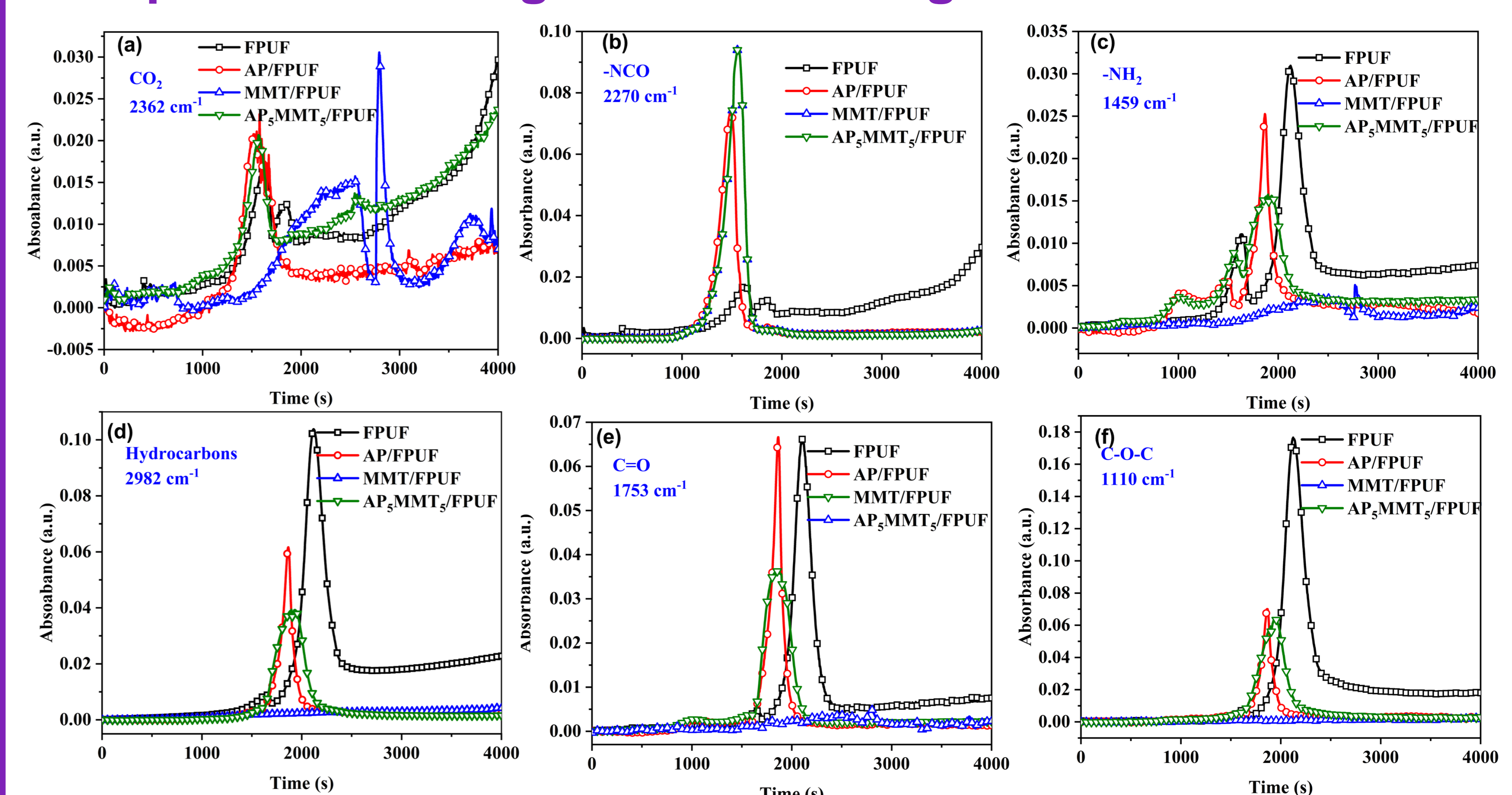
Flame retardancy



Burning behavior



Gas products during the thermal degradation



Conclusion

- The surface of FPUF was flat and presented no flaw, and the edge lines were smooth, suggesting that flame-retardant treatment barely influenced FPUF.
- AP/MMT coatings with a suitable weight ratio effectively improve the flame retardant performance of FPUF.

Acknowledgments

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