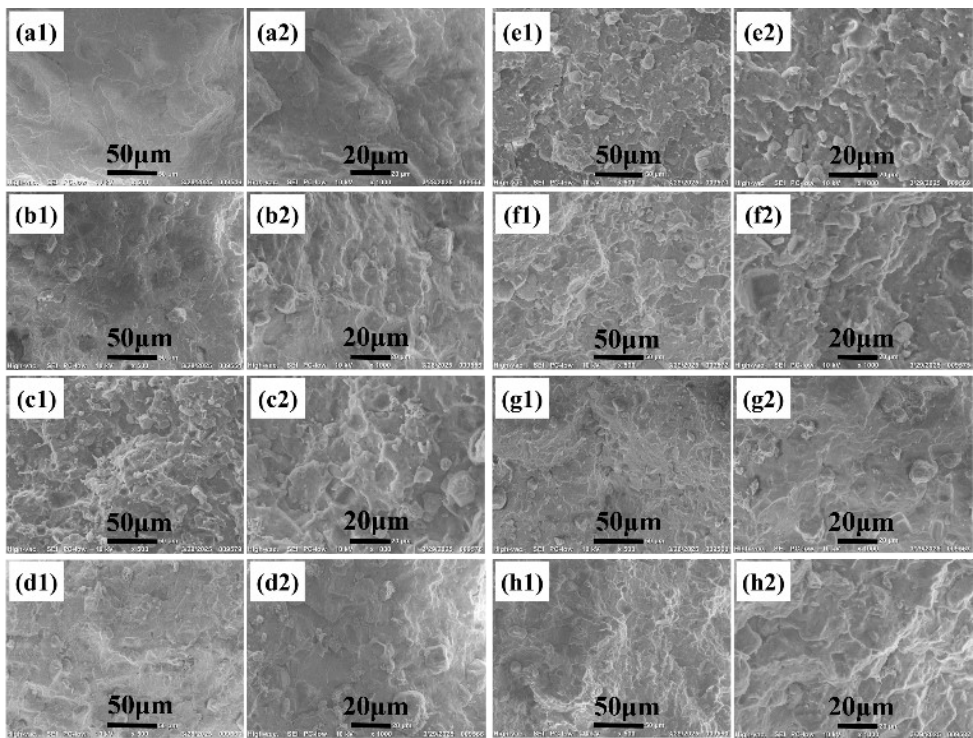


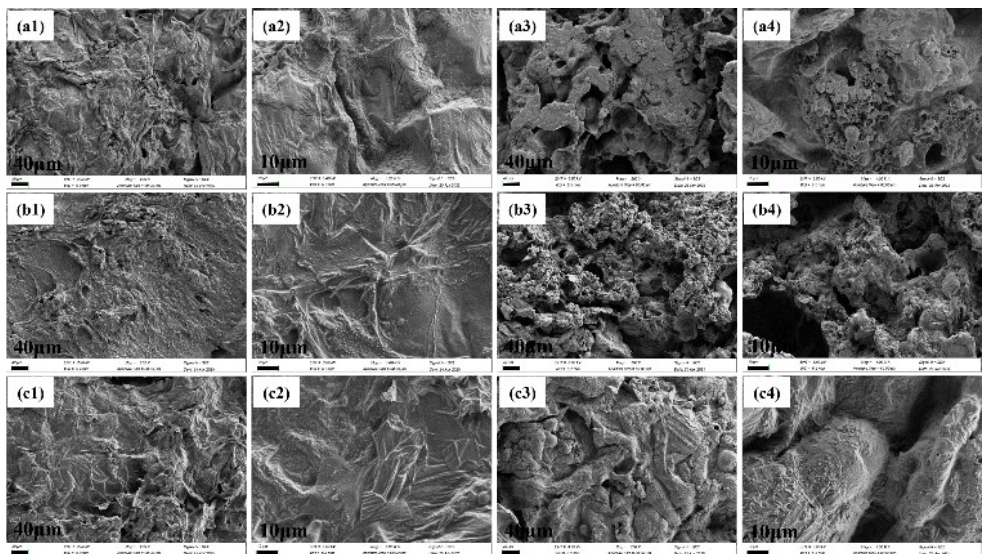
## Supplementary Information:

**Table S1.** The elemental analysis data of flame retardant synergist BAAEP

Element Content [%]	Calculated value				Measured value			
	C	H	N	O	C	H	N	O
	58.18	9.01	20.88	11.92	54.25	10.85	25.62	9.28



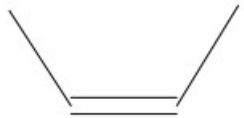
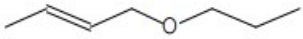
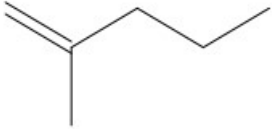
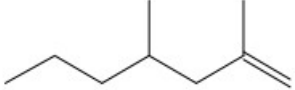
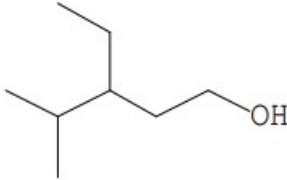
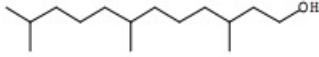
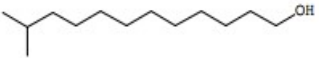
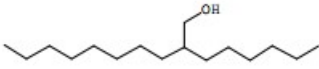
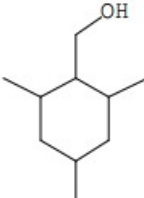
**Fig. S1** SEM images of PP and its flame-retardant composites, where (a)-(h) represent samples PP, P1-P7 respectively; numbers 1 and 2 indicate magnifications of 500 and 1000, corresponding to scale bars of 50  $\mu\text{m}$  and 20  $\mu\text{m}$ , respectively.

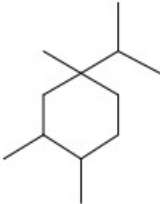
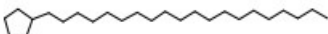
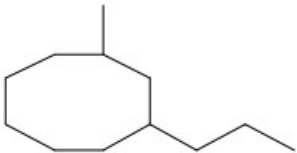
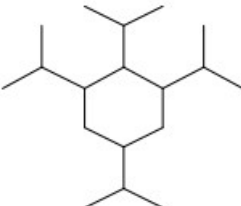


**Fig. S2** SEM images of char residue after cone calorimeter test: (a) P1; (b) P2; (c) P6;

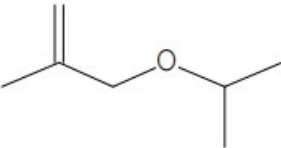
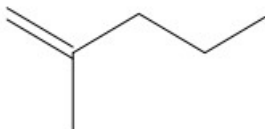
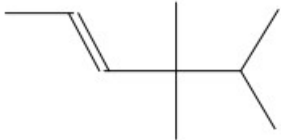
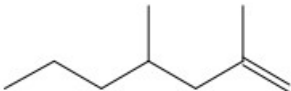
numbers 1-2 represent the outer char layer at 500x and 1000x magnification, respectively, and numbers 3-4 represent the inner char layer at 500x and 1000x magnification, respectively.

**Table S2.** The structure of the main pyrolysis products of PP was tested by Py-GCMS.

Peak area (%)	Retention time (min)	Assigned structure
1.61	1.45	
2.63	1.60	
3.83	1.93	
20.03	5.23	
1.64	6.17	
2.54	9.59	
4.57	13.25	
1.99	16.30	
1.80	17.23	

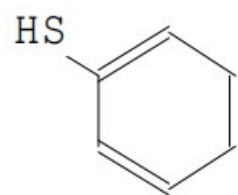
1.95	18.96	
3.82	19.50	
2.94	26.13	
3.82	29.50	

**Table S3.** The structure of the main pyrolysis products of P1 was tested by Py-GCMS.

Peak area (%)	Retention time (min)	Assigned structure
1.60	1.60	
2.06	1.92	
1.25	5.01	
15.43	5.20	

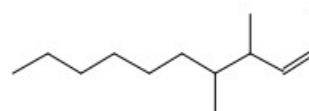
9.06

7.40



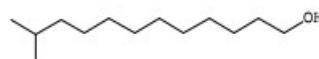
1.89

9.58



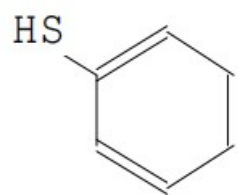
3.98

13.24



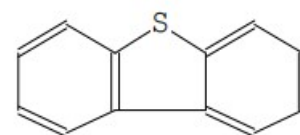
2.18

17.46



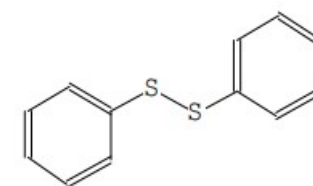
1.92

19.63



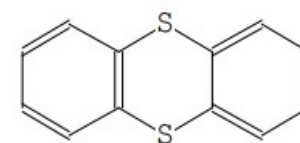
7.73

21.61



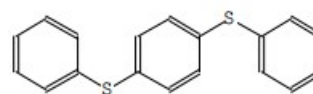
3.70

23.61



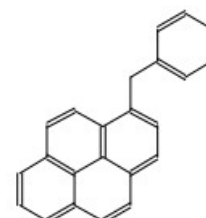
3.61

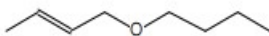
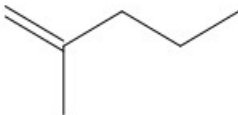
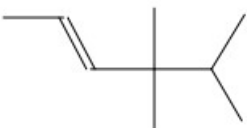
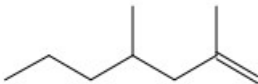
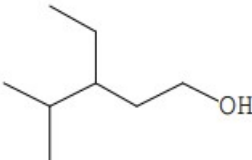
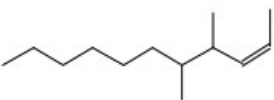
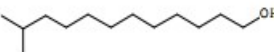
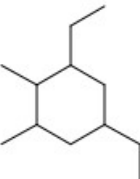
27.87



1.77

29.54



Peak area (%)	Retention time (min)	Assigned structure
2.25	1.60	
2.64	1.92	
2.28	5.02	
18.77	5.20	
1.63	6.16	
2.28	9.58	
4.76	13.24	
1.81	29.19	
1.94	30.75	