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Synthesis of a novel polyphosphate and its application with APP in flame retardant PLA

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Supporting materials

The mechanical properties of PLA and its flame retardant composites were studied by tensile test and the results listed in Table S1. Fig. S1 presented the stress-stain curves of PLA and its blends. The pure PLA is a brittle material and shows no yielding behavior during the test. When 15 wt% flame retardant was added into PLA, the PLA composites exhibited brittle performance as well during the tensile test. With regards to tensile strength and elongation at break, the presence of flame retardant has a deleterious effect on both of the properties. PLA/15PFRS has a relatively milder recession compared with pure PLA, which is presumably due to the good compatibility of semi-solid PFRS and PLA matrix. However, the deleterious effect of tensile strength and elongation at break for PLA/3.8PFRS/11.2APP can't be ignored, which may be due to the introduced APP powder exhibit a higher melting point than

the processing temperature of PLA matrix. This feature leads to a poor dispersion and hence increased the amount of flaws for PLA composites.

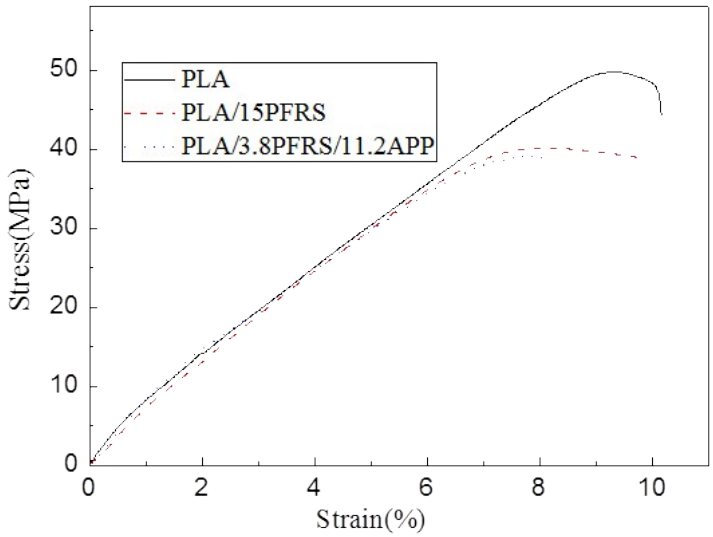

Fig.S1 Typical stress-strain curves of pure PLA and its composites

Table S1 Summarized mechanical properties of pure PLA and its composites

Sample	Tensile strength (MPa)	Young's modulus (GPa)	Elongation at break (%)
PLA	49.7±2.9	0.9±0.2	10.0±2.6
PLA/15PFRS	43.5±1.5	0.7±0.1	9.8±0.9
PLA/3.8PFRS/11.2APP	38.8±2.1	0.9±0.1	8.2±0.7