

## Supplementary materials

Table S1 Chemical shifts and relatively peak areas of different-species phosphorus in the  $^{31}\text{P}$ -NMR spectra at different temperatures

	Ortho-P		Monoesters-P		Diesters-P		Pyro-P	
	Chemical shift (ppm)	Peak area (%)	Chemical shift (ppm)	Peak area (%)	Chemical shift (ppm)	Peak area (%)	Chemical shift (ppm)	Peak area (%)
5°C	5.68	42.3	4.16	3.4	-2.05	1.3	-5.01	3.5
15°C	5.48	45.05	-	-	-	-	-5.01	2.48
25°C	5.71	55.04	-	-	-	-	-5.01	14.23
35°C	5.48	30.2	-	-	-	-	-5.01	3.6

	End groups of poly-P		Middle groups of poly-P		Average chain length of poly-P
	Chemical shift (ppm)	Peak area (%)	Chemical shift (ppm)	Peak area (%)	
5°C	-4.37	10.3	-19.38	39.2	9.6
			-20.90		
15°C	-4.51	5.67	-18.89	46.8	18.51
	-4.57		-18.93		
			-19.53		
			-20.90		
25°C	-4.37	6.86	-18.53	23.87	8.96
	-4.51		-18.89		
			-18.93		
35°C	-4.46	20.6		45.6	6.43
	-4.53				

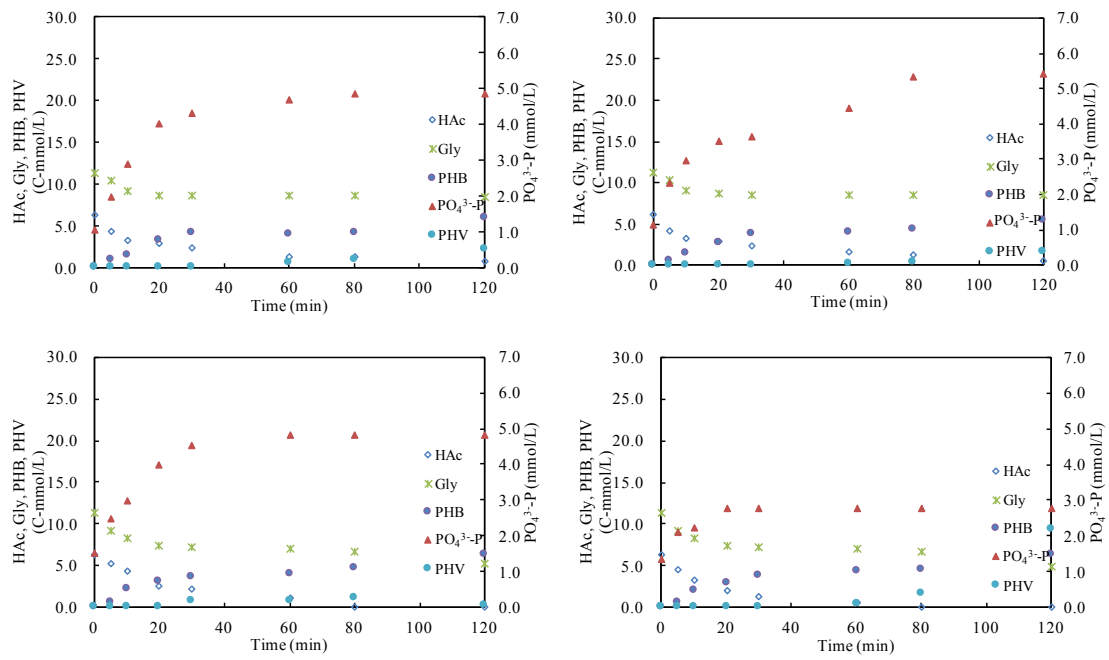


Fig. S1 Changes of TP concentration and distribution in anaerobic sludge at different temperatures