Electronic Supplementary Material (ESI) for Journal of Materials Chemistry C.

Supporting Information

Temperature and pH tunable plasmonic property and SERS efficiency of the silver nanoparticles within the dual-stimuli responsive microgels

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Figure S1 Appearance picture of AgNPs/(PNIPAM/PAA IPN) hybrid microgels aqueous dispersions with different AgNPs contents

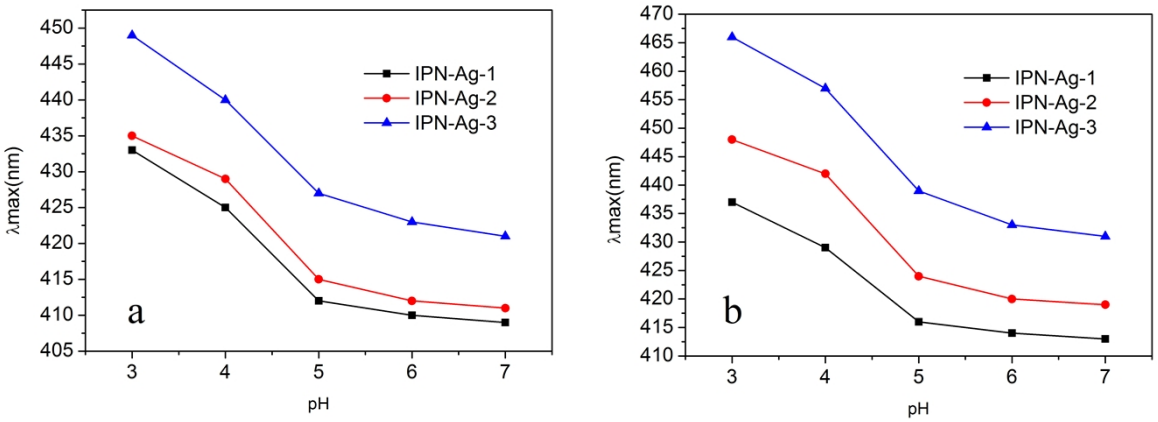


Figure S2 The plots between the λ_{max} and pH value for all AgNPs/(PNIPAM/PAA IPN) hybrid microgels under the temperature of 20°C (a) or 40°C (b)

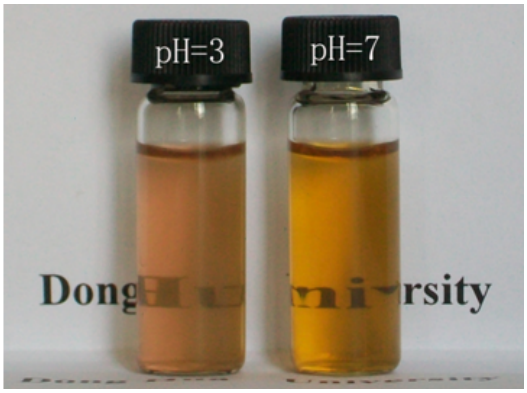


Figure S3 Appearance photo of AgNPs/(PNIPAM/PAA IPN) hybrid microgels dispersions at pH=3.0 (left) and pH=7.0 (right)

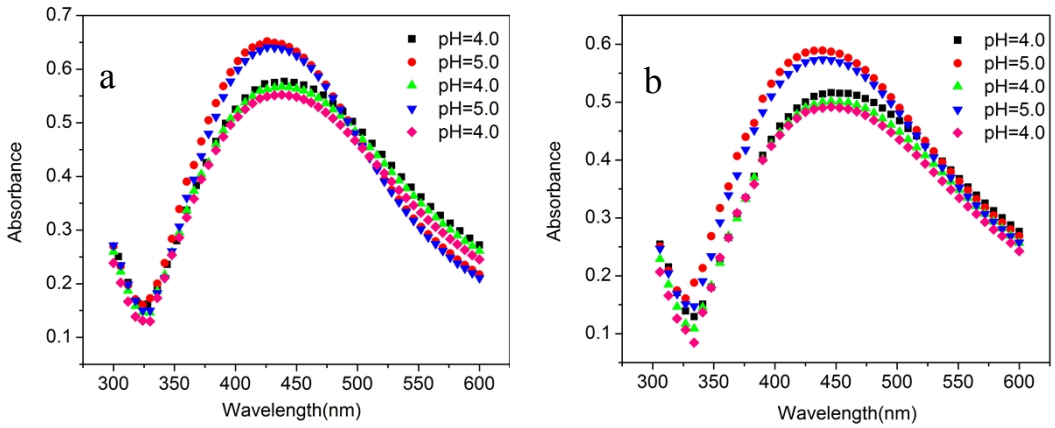


Figure S4 UV-vis spectra of IPN-Ag-3 aqueous dispersion at alternating pH between 4.0 and 5.0 under the temperature of 20°C (a) or 40°C (b)

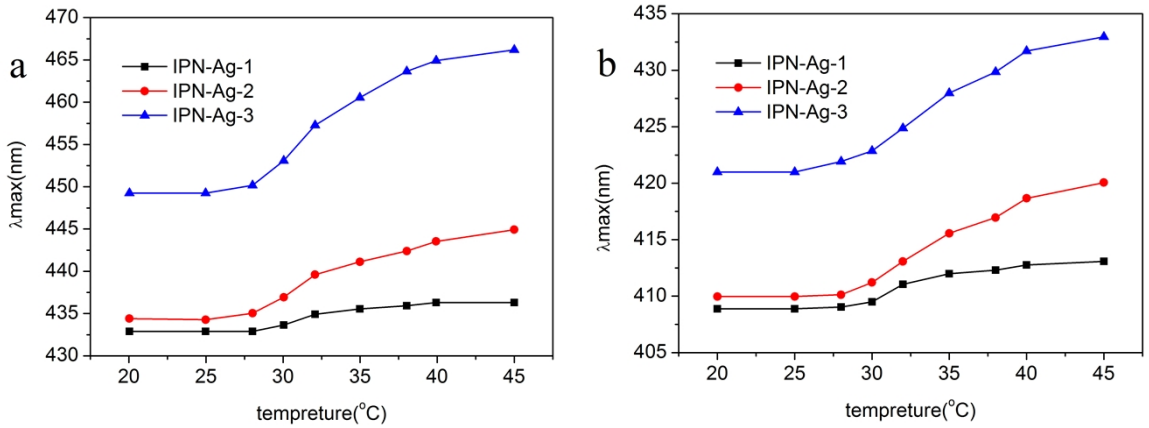


Figure S5 The plots between the λ_{max} and temperature for all AgNPs/(PNIPAM/PAA IPN) hybrid microgels under the pH value of 3.0 (a) or 7.0 (b)

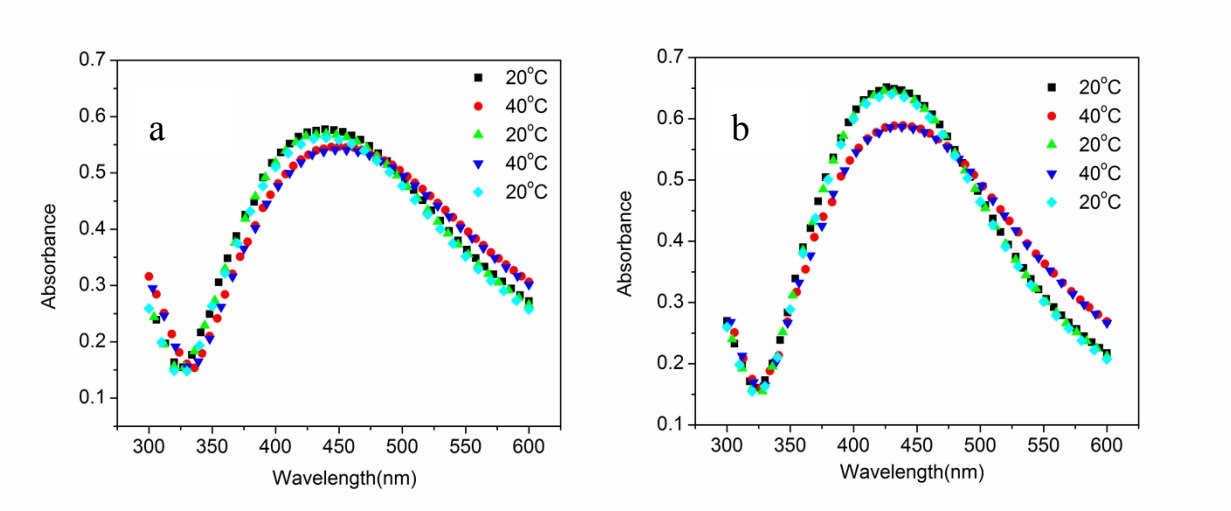


Figure S6 UV-vis spectra of IPN-Ag-3 aqueous dispersion at alternating temperature between 20°C and 40°C at the pH value of 3.0 (a) or 7.0 (b)

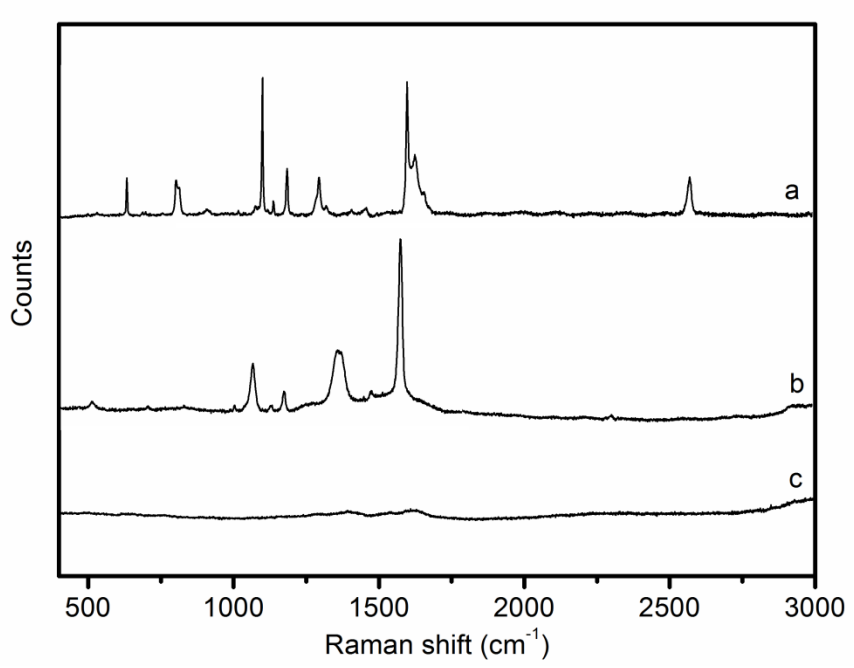


Figure S7 Raman spectrum of PMBA powder (a) and SERS spectrum of 10^{-6} M PMBA in aqueous solution using AgNPs/(PNIPAM/PAA IPN) hybrid microgels as substrates (b) and Raman spectrum of pure AgNPs/(PNIPAM/PAA IPN) hybrid microgels in aqueous solution (c)

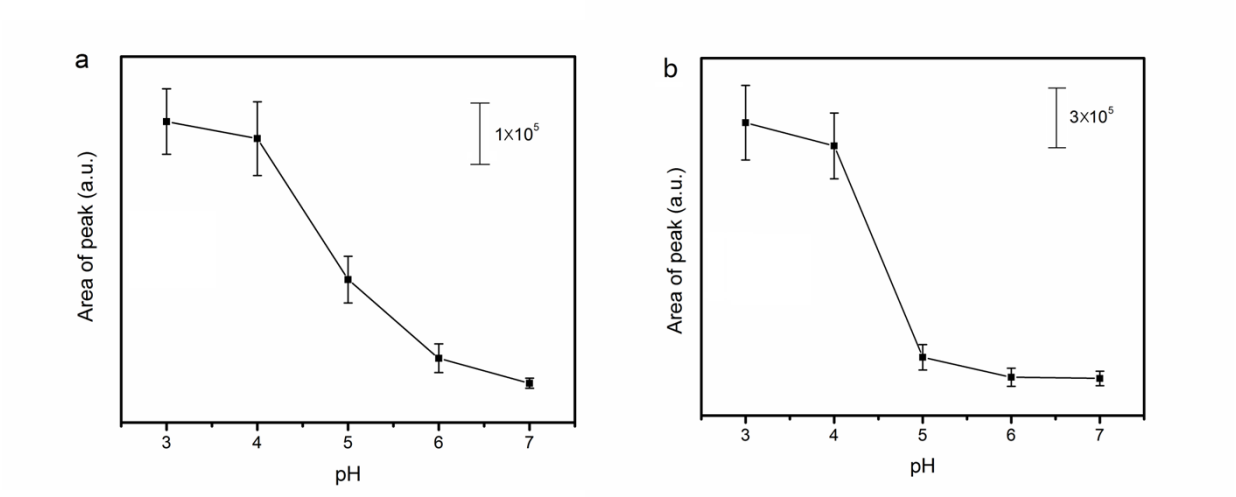
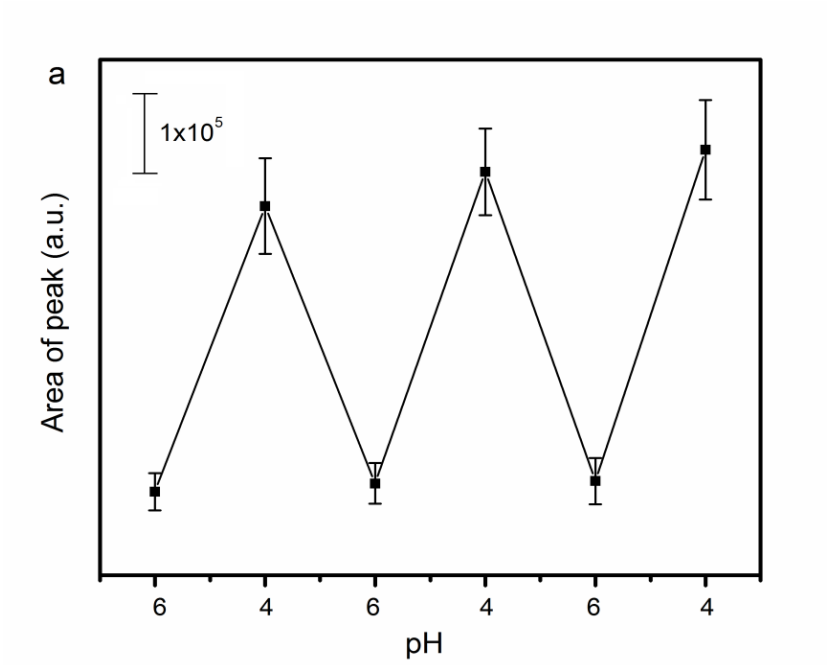


Figure S8 1584 cm^{-1} peak areas in the SERS spectra of PMBA using AgNPs/(PNIPAM/PAA IPN) hybrid microgels as substrates as a function of pH value at 20°C (a) or 40°C (b)



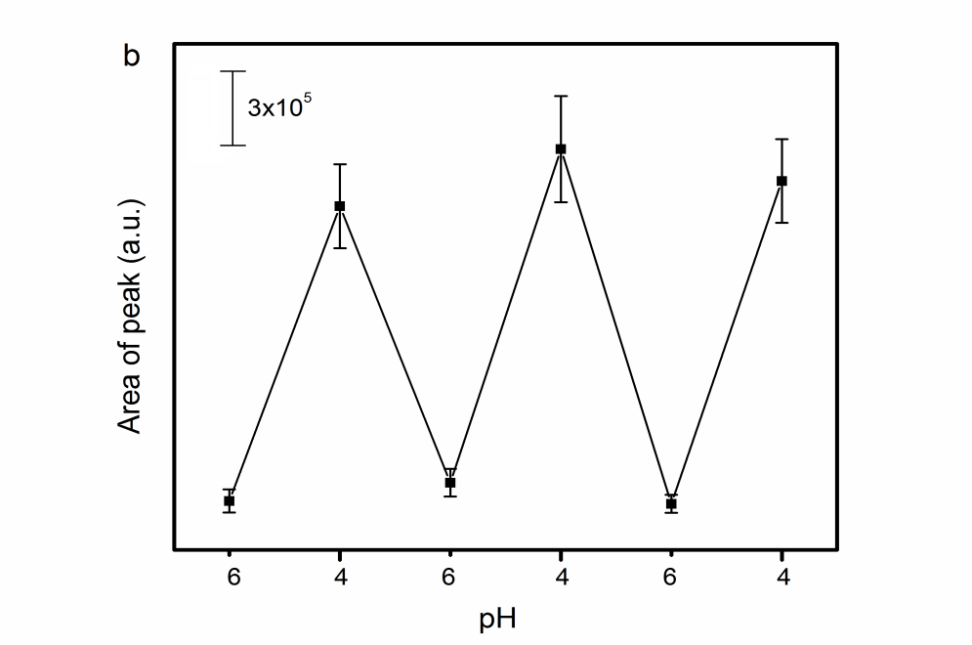
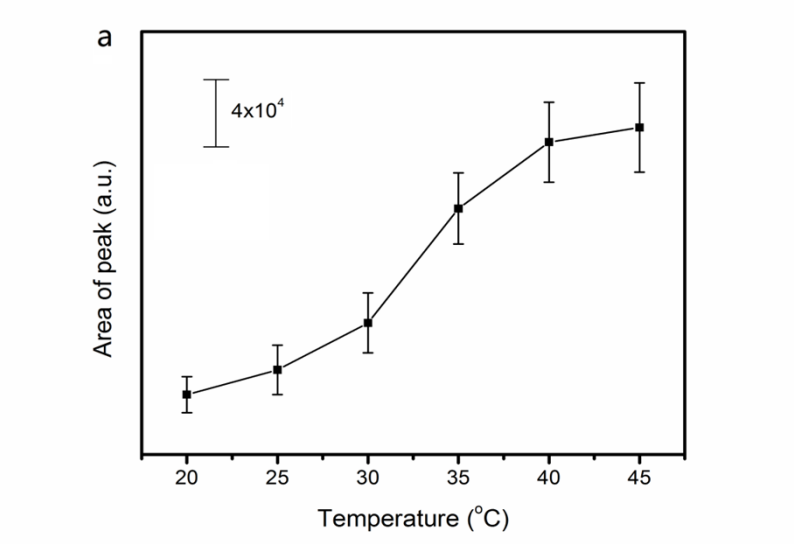


Figure S9 The areas of 1584 cm^{-1} peaks of the SERS spectra of PMBA using AgNPs/(PNIPAM/PAA IPN) hybrid microgels as substrates at alternating pH values between 4.0 and 6.0 at 20°C (a) or 40°C (b)



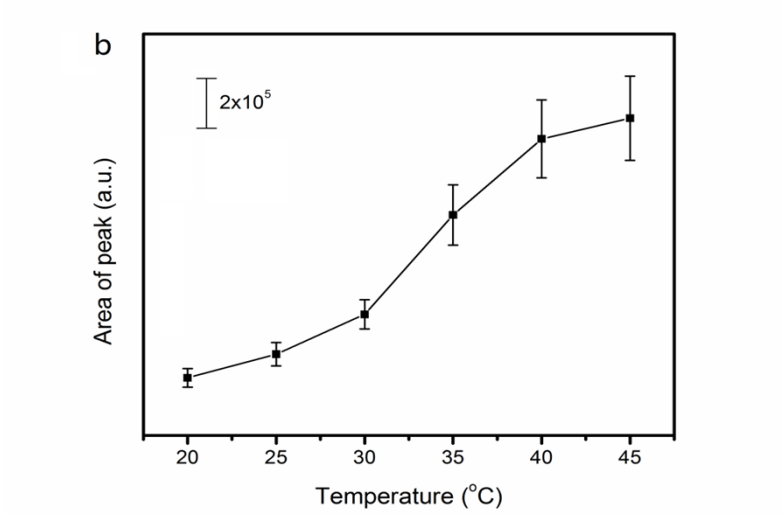
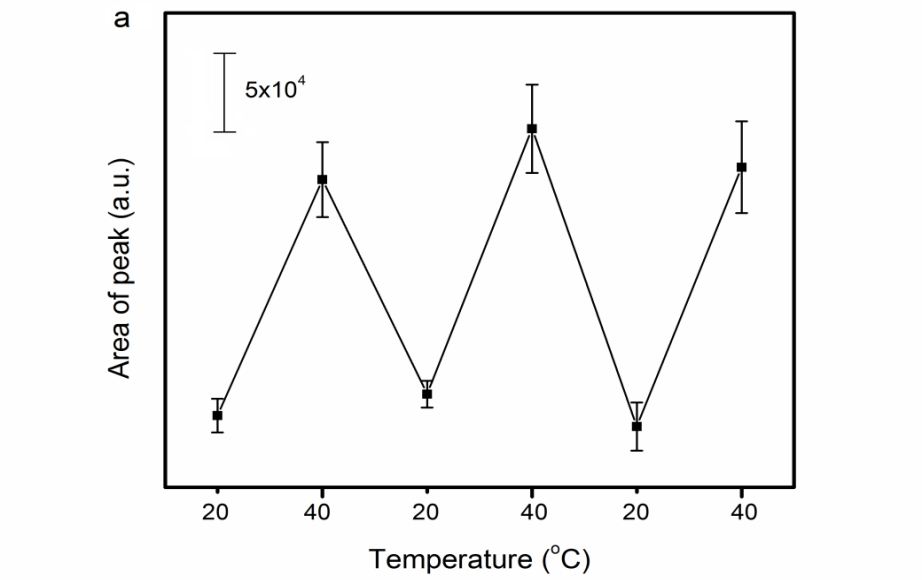


Figure S10 The areas of 1584 cm^{-1} peak in the SERS spectra of 10^{-6} M PMBA aqueous solution using AgNPs/PNIPAM hybrid microgels as substrates as a function of temperature at pH 6.0 (a) and pH 4.0 (b)



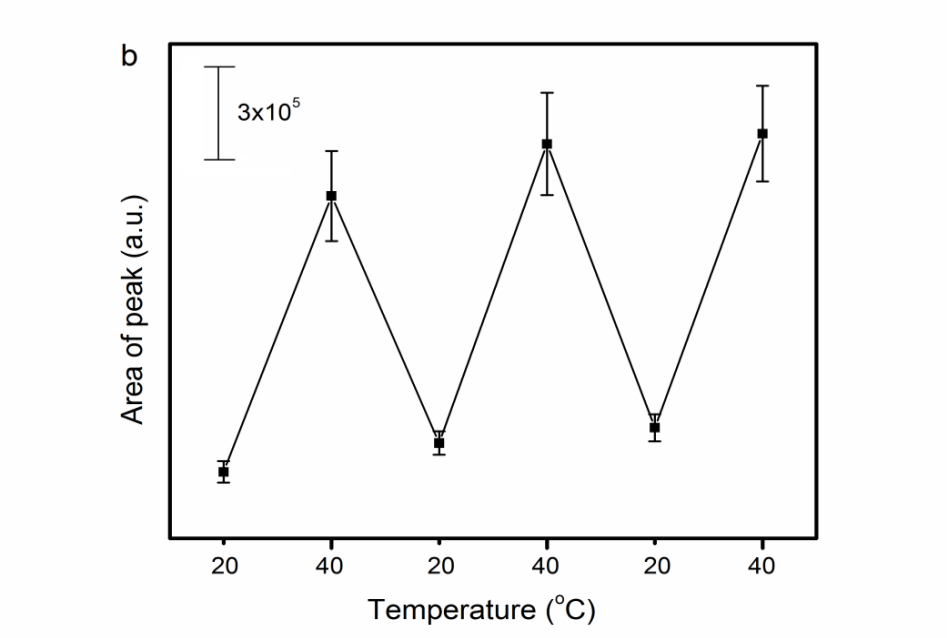


Figure S11 The areas of 1584 cm^{-1} peaks of the SERS spectra of 10^{-6} M PMBA aqueous solution using AgNPs/(PNIPAM/PAA IPN) hybrid microgels as substrates at alternating temperatures between 20°C and 40°C under pH 6.0 (a) or 4.0 (b)

Table S1 Temperature measuring results using AgNPs/(PNIPAM/PAA IPN) hybrid microgels as SERS microsensors (pH=6.0)

Measuring times	Temperature 1		Temperature 2	
	1584 cm^{-1} peak area (a.u.)	The obtained temperature (℃)	1584 cm^{-1} peak area (a.u.)	The obtained temperature (℃)
1	154029	22.9	300552	42.2
2	160567	25.1	283229	37.8
3	170961	27.8	287923	38.7
4	157717	24.0	271717	36.5
5	149944	21.7	279652	37.3
Average temperature (℃)	24.3		38.5	
RSD (%)	9.6		5.7	

Table S2 pH value measuring results using AgNPs/(PNIPAM/PAA IPN) hybrid microgels as SERS microsensors (T=20℃)

Measuring times	pH 1		pH 2	
	1584 cm^{-1} peak area (a.u.)	The obtained pH value	1584 cm^{-1} peak area (a.u.)	The obtained pH value
1	548073	3.6	144176	6.2
2	464602	4.3	146897	6.1
3	550823	3.5	132506	6.3
4	540573	3.8	161294	5.9
5	509897	4.0	138323	6.3
Average pH value	3.8		6.2	
RSD (%)	7.9		3.2	