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Preparation of Hydrophilic Interpenetrating Polymer Network Microcapsules and Their Temperature Responsive Properties

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Introduction

The microcapsule is one of the most useful devices to release active ingredient in more effective, longer, and safer manner. Hydrophilic polymers, such as PVA (poly(vinyl alcohol)) and PNIPAAm (poly(N-isopropylacrylamide)), were employed as the wall material of microcapsules. The IPN structure of microcapsule gave not only a mechanical strength, but also possibility to show stimuli-response. The IPN microcapsules had good temperature-sensitivity.

Experimental

The microencapsulation process and condition used in this study are illustrated in Table 1.

Table 1. Condition of microencapsulation process.

w/o emulsion	Phase	Condition	Amounts
1	Continuous	Organic solvent	100ml
	Dispersed	Span 80	3vol%
2	Dispersed	Polymer solution	10ml
	Continuous	Polymer concentration(PVA:PN)	(5wt%,3wt%)
	Dispersed	Organic solvent	100ml
	Dispersed	Span 80	3vol%
		GA solution(25%) HCl(5%)	5ml 4drop

Results and Discussion

The core/shell structure of microcapsules was confirmed by microscope as shown in Figure 1. The existence of PNIPAAm in IPN microcapsule was confirmed by FT-IR peak analysis as N-H wagging appeared from IPN microcapsules as shown in Figure 1. The increased hydrophilicity played a role in the increase of the LCST.

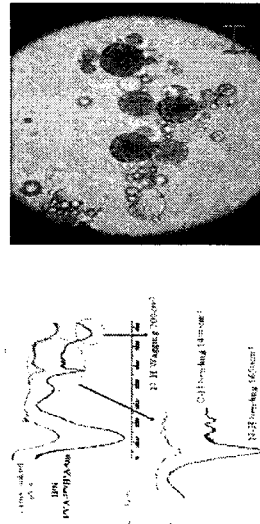


Fig. 1. Morphology and FT-IR spectra of microcapsules.

Conclusions

IPN-structured microcapsules were prepared by emulsion interfacial reaction. They had core/shell structure and they showed temperature-responsive properties and increased hydrophilicity.

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