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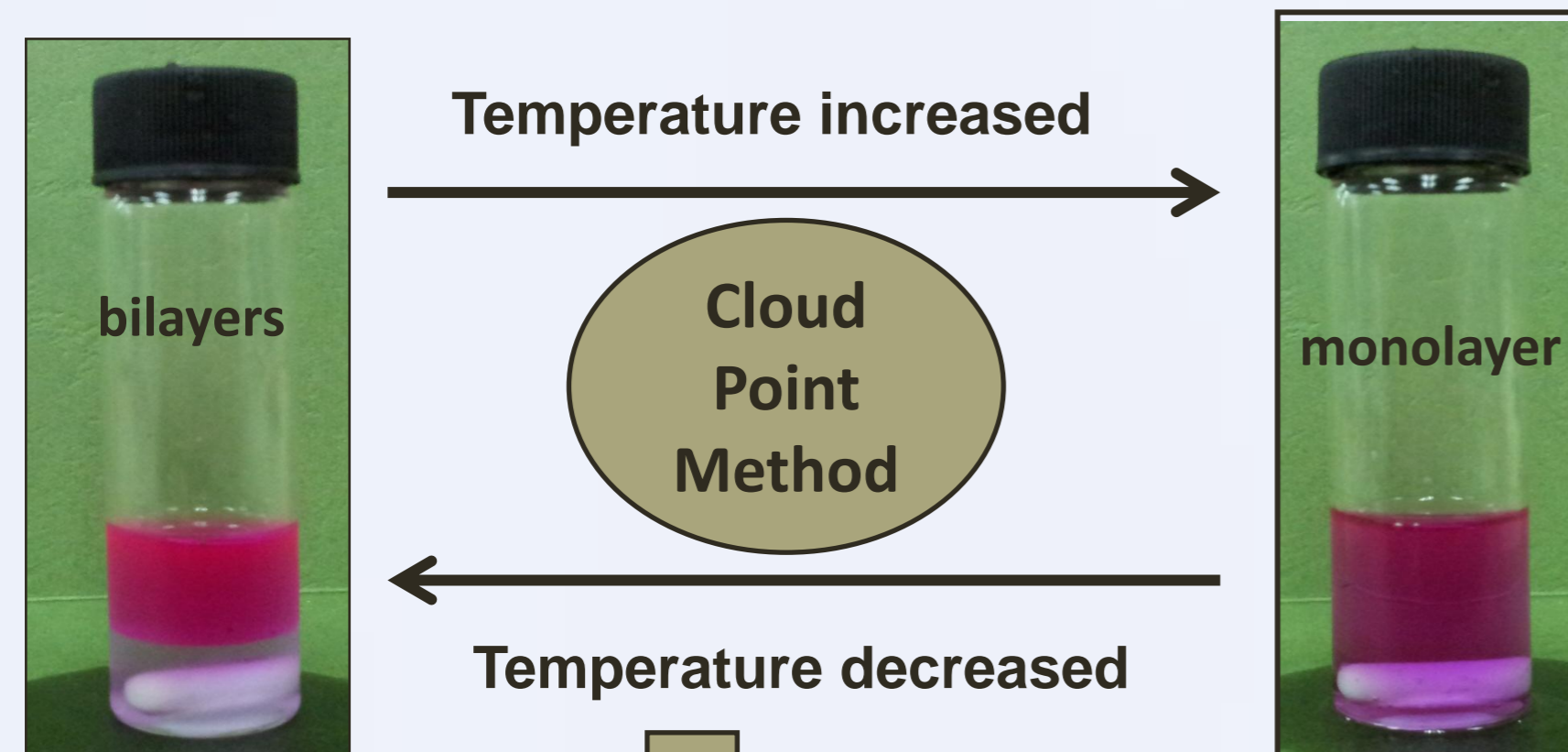
INTRODUCTION

- ❖ Two new protic ionic liquids *i.e.* bis-(2-ethylhexyl)ammonium tosylate [BEHA tosylate] and tris-(2-ethylhexyl)ammonium tosylate [TEHA tosylate] were synthesized via neutralization reaction and characterized to be used as an extractor to separate azeotropic mixture of water and isopropanol.
- ❖ The miscibility of protic ionic liquids with water and isopropanol generally increases upon heating, and both systems undergo an upper critical solution temperature (UCST) type phase transition.
- ❖ The chemical activities during phase separation and phase miscibility, both ternary mixtures were analyzed using Proton Magnetic Nuclear Resonance (¹HNMR).

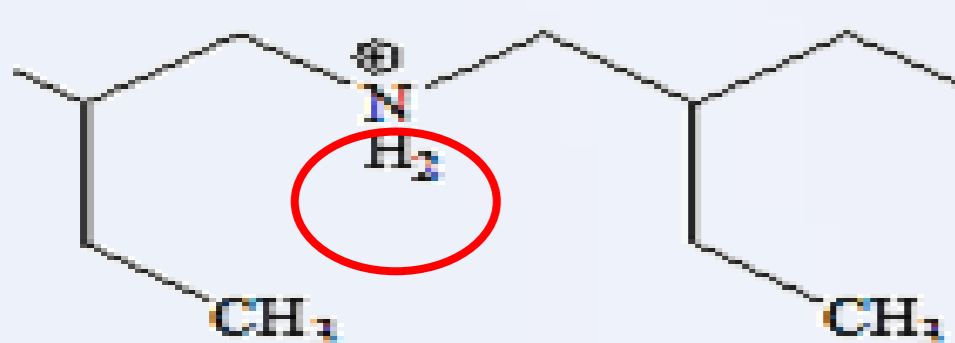
AIMS

- ❖ To investigate the chemical behaviour during phase miscibility and phase separation.
- ❖ To comprehend the effect of cation and molecular weight of new protic ionic liquids toward miscibilities of the ternary mixtures.
- ❖ To determine temperature dependence of efficiency new protic ionic liquids in extraction isopropanol from water.

EXPERIMENTAL



In order to understand more on chemical activities of the phase separation, ¹HNMR studies were conducted on the mixtures when it formed single clear phase, clear biphasic layers, ionic-liquid rich phase and aqueous-rich phase.

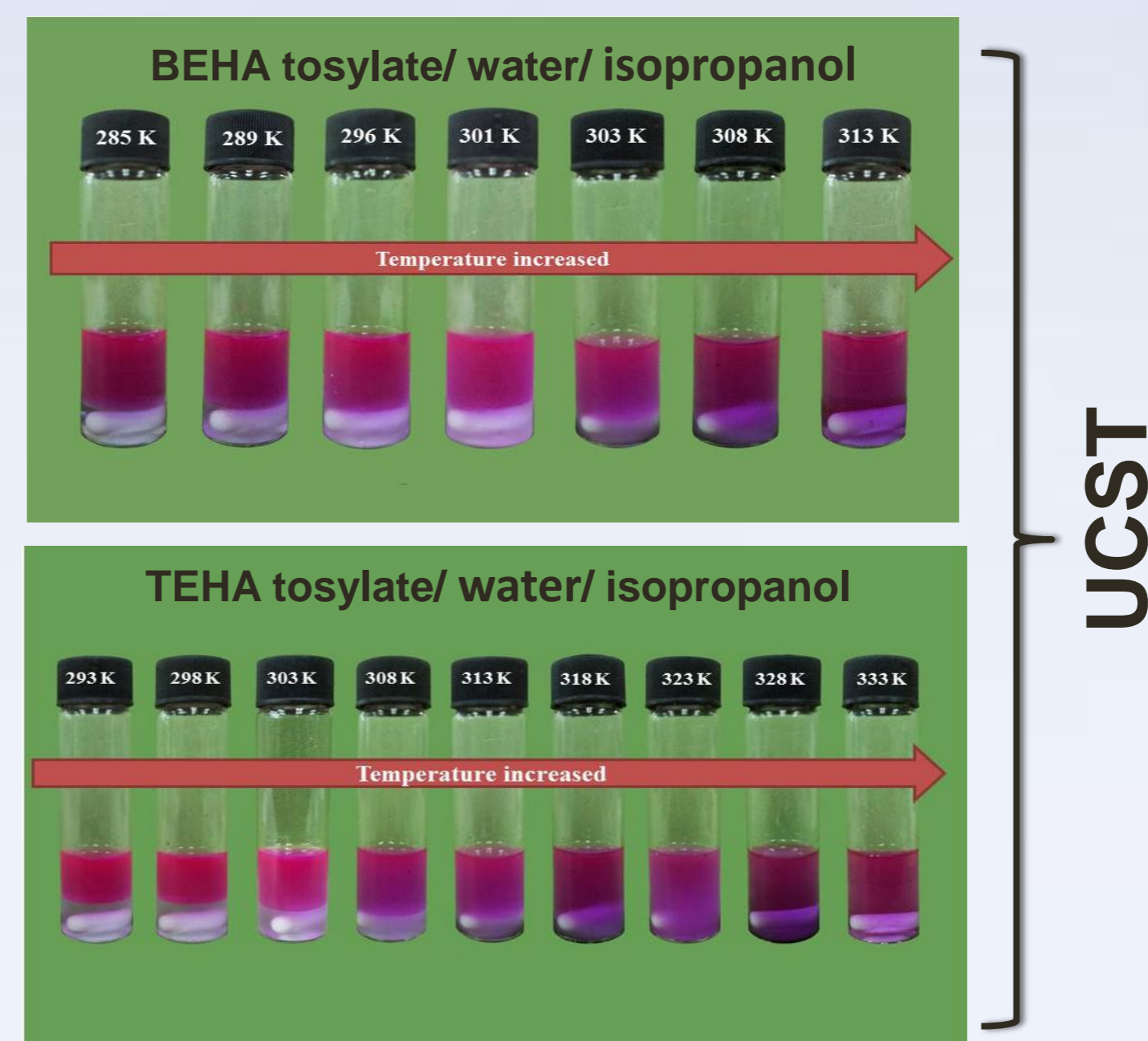


Ionic liquid rich phase

Aqueous liquid rich phase

Both layers were extracted out for composition analysis

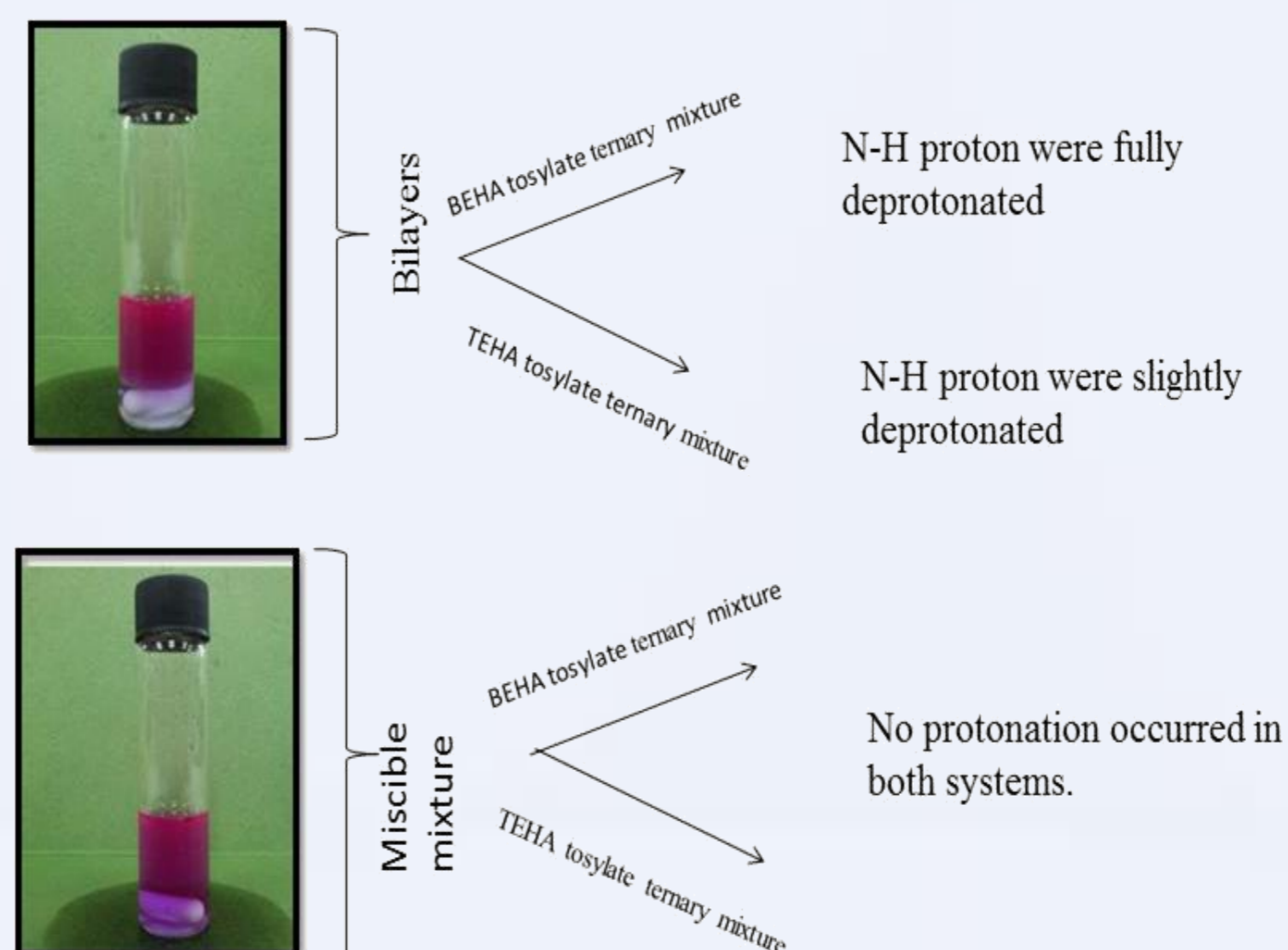
RESULTS AND DISCUSSIONS



1

Both ternary mixtures exhibited upper critical solution temperature (UCST) behaviour

Observation on the thermo-responsive ternary mixtures



2

Both system shows that the separation was driven by the loss of N-H proton

Proton nuclear magnetic resonance (¹HNMR) of the thermo-responsive ternary mixtures.

Organic rich phase			
Temperature (K)	BEHA tosylate content (wt %)	Water content (wt %)	Isopropanol content (wt %)
285	32.85	6.18	60.97
289	36.37	6.39	57.24
296	51.70	7.42	40.88
301	55.37	9.44	35.19
304	59.85	10.41	29.74

Organic rich phase			
Temperature (K)	TEHA tosylate content (wt %)	Water content (wt %)	Isopropanol content (wt %)
293	39.81	12.27	47.92
298	44.24	13.12	42.64
303	45.78	15.08	39.14
308	50.45	19.21	30.35
313	51.89	21.34	26.77

Composition analysis of thermo-responsive ternary mixtures.

3

Both synthesized new protic ionic liquids successfully extracted isopropanol from water

References:

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