Electronic Supplementary Material (ESI) for RSC Advances.

Hexafluoroisopropanol-based Deep Eutectic Solvents for High-performance DNA Extraction

Jia Xu, Yuan Yang, Xiaonan Cai and Han Xiao*

Institute of Maternal and Child Health, Wuhan Children's Hospital (Wuhan Maternal and Child Healthcare Hospital), Tongji Medical College, Huazhong University of Science & Technology, Wuhan, 430016, China.

*** Corresponding author: Han Xiao**

E-mail address: tjxiaohan@hust.edu.cn (H. Xiao)

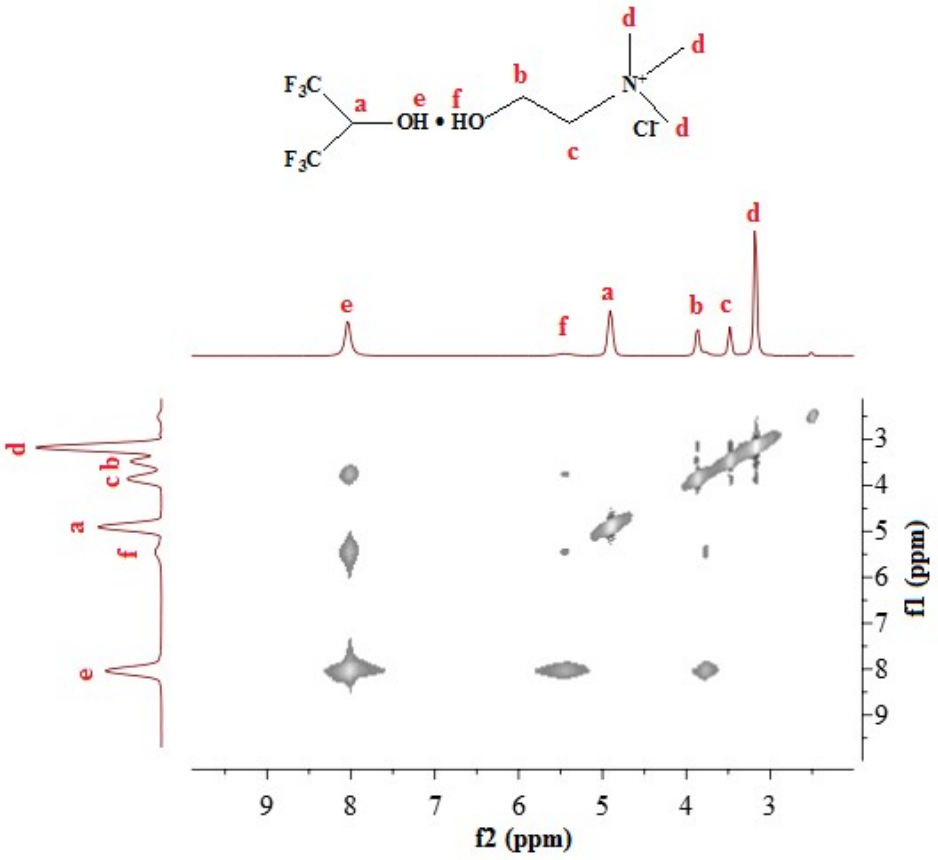

Fig. S1 NOESY spectra of HFIP/ChCl DES.

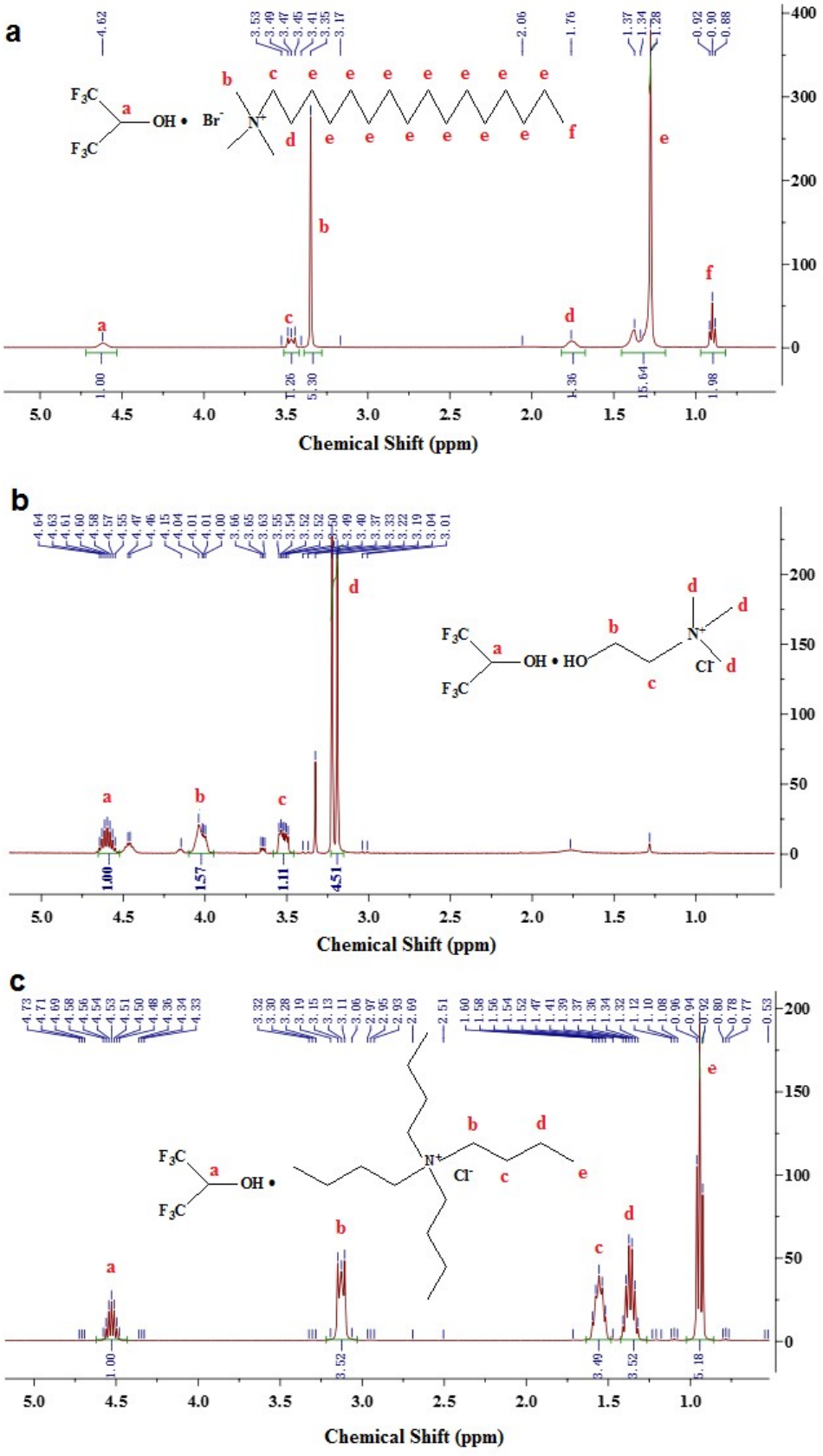

Fig. S2 [1]H-NMR spectra of: (a) HFIP-CTAB, (b) HFIP-ChCl and (c) HFIP-TBAC.

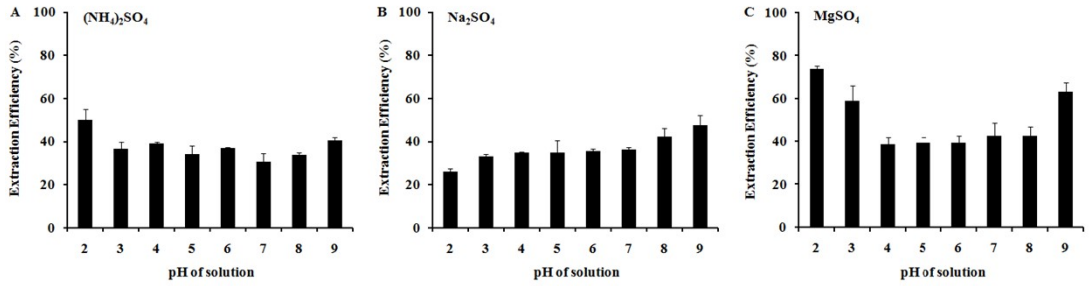

Fig. S3 The effects of sample pH on the extraction of BSA in HFIP-ChCl-$(NH_4)_2SO_4$, HFIP-ChCl-Na_2SO_4 and HFIP-ChCl-$MgSO_4$ systems.

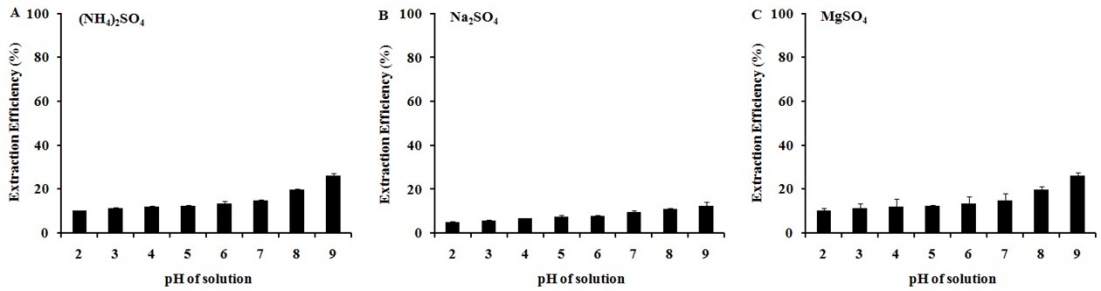

Fig. S4 The effects of sample pH on the extraction of RNA in HFIP/ChCl-$(NH_4)_2SO_4$, HFIP/ChCl-Na_2SO_4 and HFIP/ChCl-$MgSO_4$ systems.

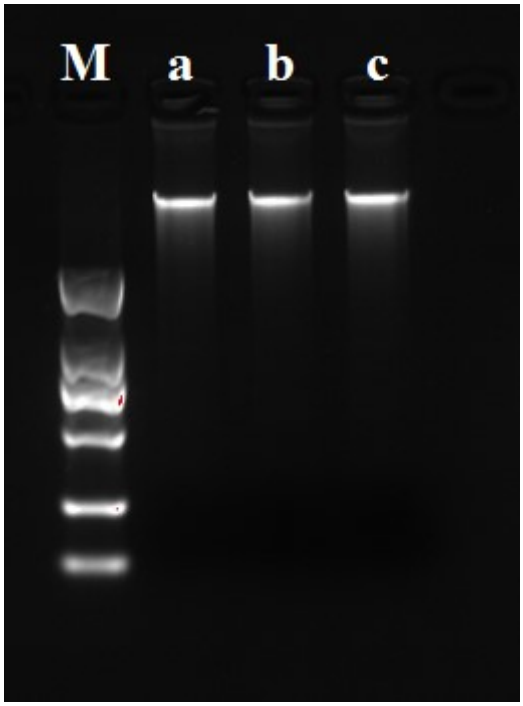

Fig. S5 Agarose gel electrophoresis of the DNA recovered from back extraction using HFIP/ChCl-$(NH_4)_2SO_4$ system (a), HFIP/ChCl-Na_2SO_4 system (b) and HFIP/ChCl-$MgSO_4$ system (c). Lane M represents the DNA molecular weight marker 2K.

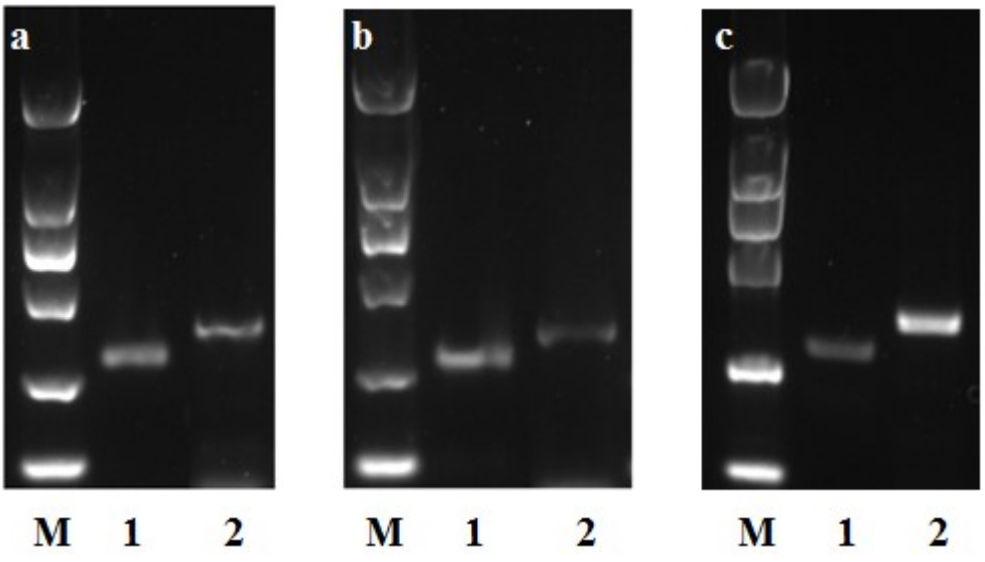

Fig. S6 PCR amplification of *TP53* (lane 1) and *EGFR* (lane 2) sequences from human whole blood using HFIP/ChCl-$(NH_4)_2SO_4$ system (a), HFIP/ChCl-Na_2SO_4 system (b) and HFIP/ChCl-$MgSO_4$ system (c). Lane M represents the DNA molecular weight marker 2K.

Table S1 The DNA partitioning behavior in HFIP-based DES systems

HBA	Inorganic salts	Two-phase formation	Two-phase formation after back extraction	Extraction efficiency of DNA after back extraction
ChCl	$(NH_4)_2SO_4$	√	√	**a**
	K_2HPO_4	√	√	**b**
	KH_2PO_4	√	×	-
	Na_2CO_3	√	√	**b**
	Na_2HPO_4	√	√	**b**
	Na_2SO_4	√	√	**a**
	$MgSO_4$	√	√	**a**
TBAC	$(NH_4)_2SO_4$	√	√	**b**
	K_2HPO_4	√	√	**b**
	KH_2PO_4	√	√	**b**
	Na_2CO_3	√	√	**b**
	Na_2HPO_4	√	√	**b**
	Na_2SO_4	√	√	**b**
	$MgSO_4$	√	√	**b**
CTAB	$(NH_4)_2SO_4$	√	×	-
	K_2HPO_4	×	-	-
	KH_2PO_4	√	×	-
	Na_2CO_3	×	-	-
	Na_2HPO_4	×	-	-
	Na_2SO_4	√	×	-
	$MgSO_4$	√	√	**b**

√ The systems can separate into two phases.

× The systems cannot be separated into two phases.

a The extraction efficiency of DNA was more than 50%.

b The extraction efficiency of DNA was less than 20%.

Table S2 The primers of genes in this study.

P53	274 bp	Forward primer	GTCCCAAGCAATGGATGATT
		Reverse primer	ACTGACCGTGCAAGTCACAG
EGFR	335 bp	Forward primer	AGACGGGAAATTCACACCAG
		Reverse primer	CTGTAAGAGGCAGGGCTTTG