Supporting information

Co-dissolution of cellulose and silk fibroin in levulinic acid-derived protic ionic liquids for composited membrane and fiber preparation

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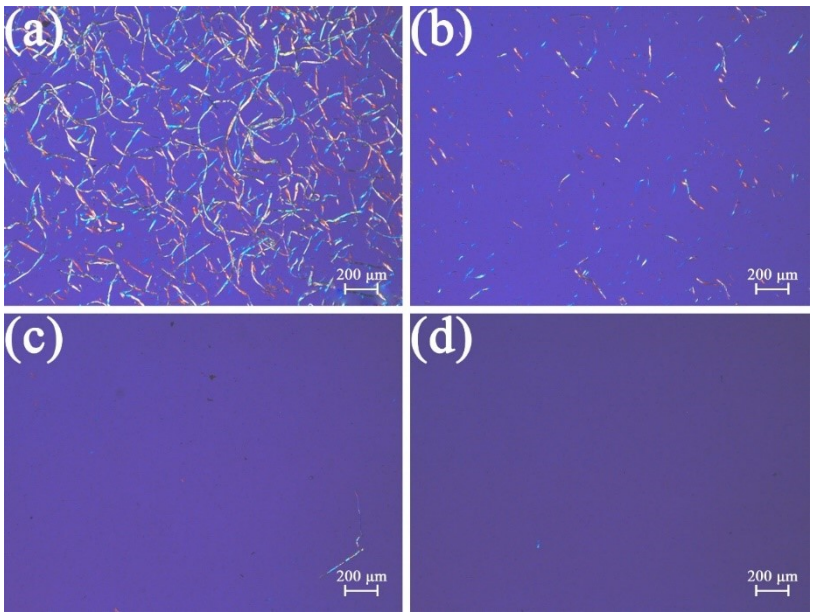

Fig. S1 POM Diagram of C100S0 at Different Time in PILs. (a) 5min. (b) 10min. (c) 20min. (d) 30min.

Table S1. Selection of regeneration solvent

Recycled Solvent	Precipitate	Film	State
Methanol	Y	Y	White film
Ethanol	Y	Y	Transparent film
Isopropyl alcohol	Y	N	Floccule

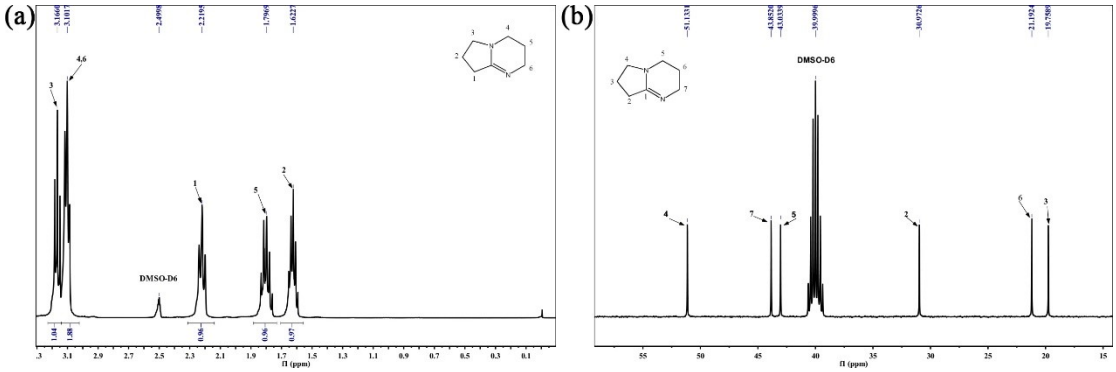

Fig. S2 (a) ^{1}H NMR spectra of DBN in DMSO-d_6, (b) ^{13}C NMR spectra of DBN in DMSO-d_6.

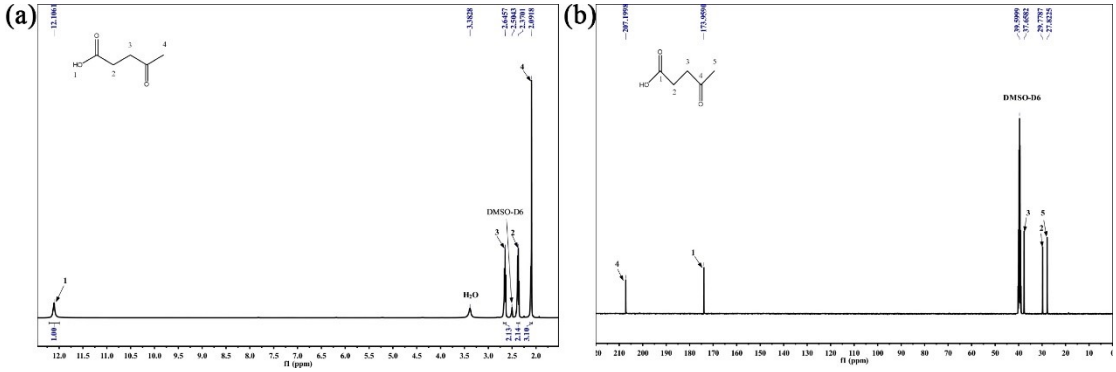

Fig. S3 (a) ^{1}H NMR spectra of levulinic acid in DMSO-d_6. (b) ^{13}C NMR spectra of levulinic acid in DMSO-d_6.

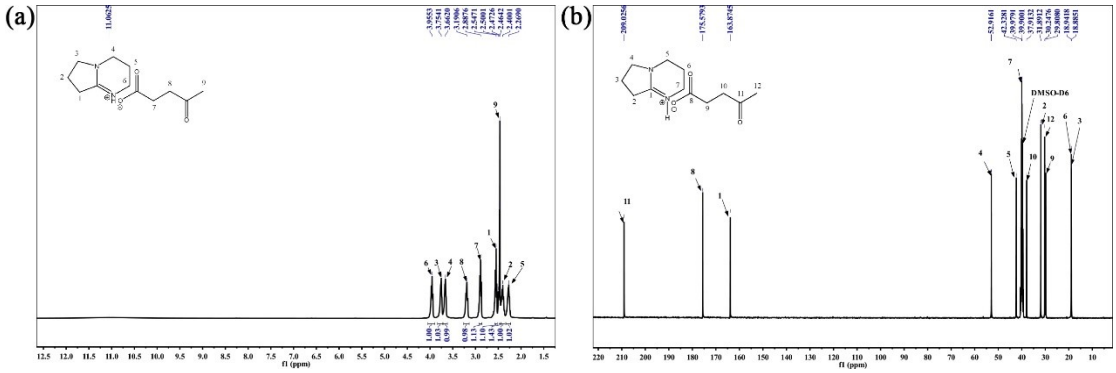

Fig. S4 (a) ^{1}H NMR spectra of PILs in DMSO-d_6. (b) ^{13}C NMR spectra of PILs in DMSO-d_6;

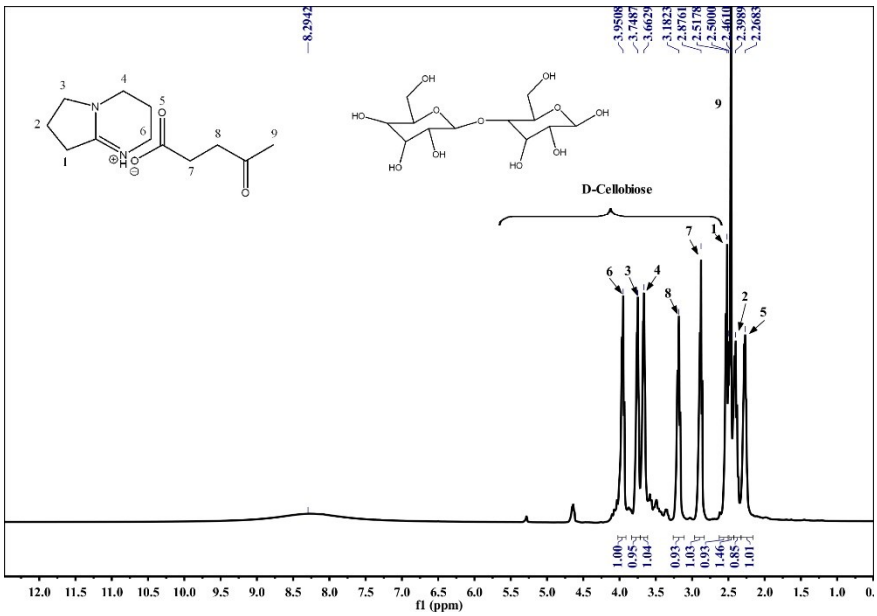

Fig. S5 Changes of ^{1}H NMR in PILs before and after dissolution**.**

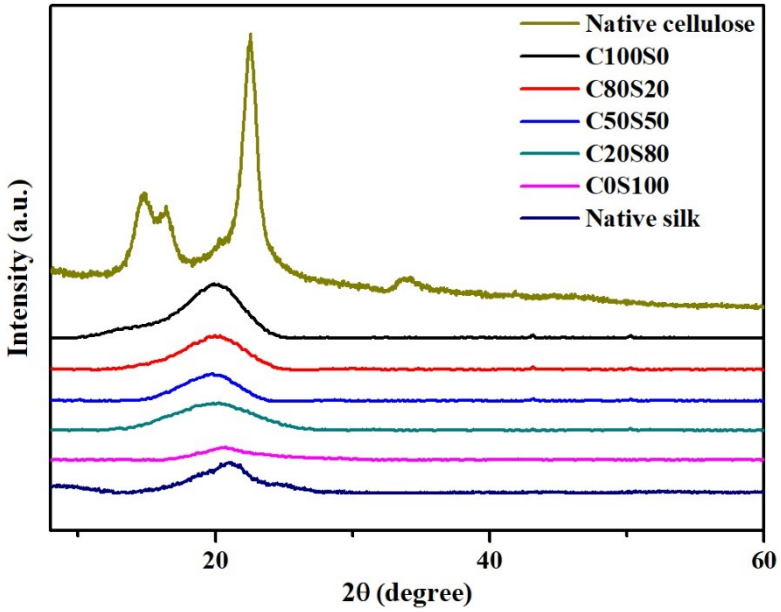

Fig. **S6** WAXS patterns of cellulose/silk fibroin composited membranes with different composite ratios.

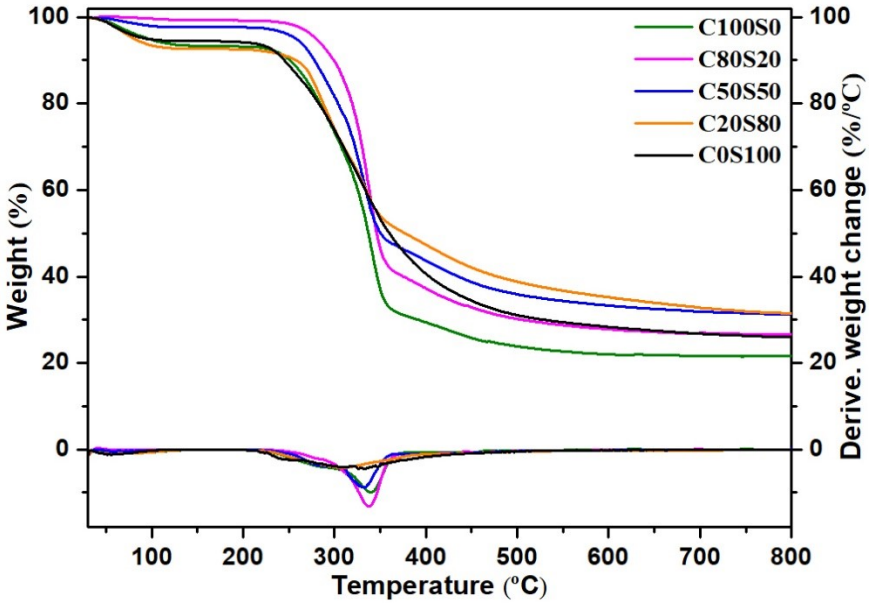

Fig. S7 Thermogravimetric analysis (TGA) and derivative thermogravimetric (DTG) curves of C100S0, C80S20, C50S50, C20S80, and C0S100 films.

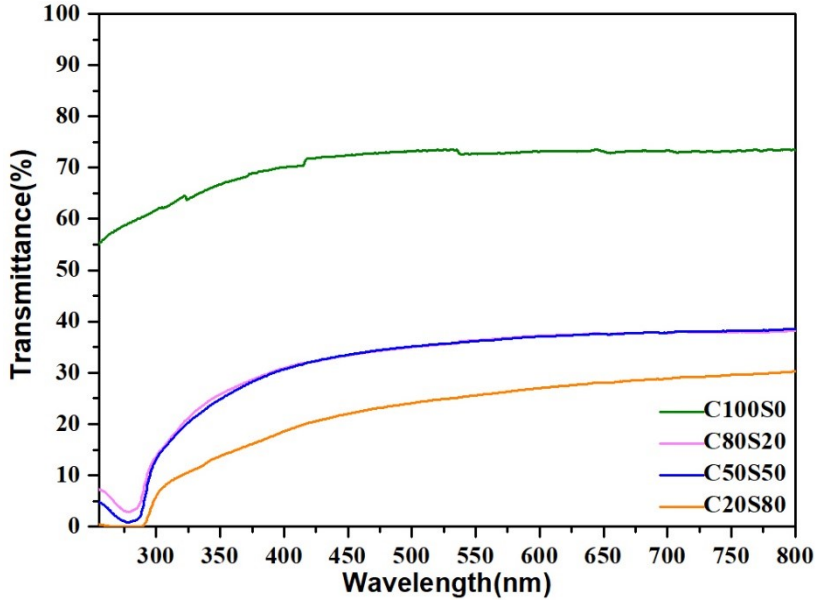

Figure S8. Ultraviolet transmittance of C100S0, C80S20, C50S50, and C20S80.

Table S2 The barrier grade of the film was evaluated by oxygen transmittance

Grade	Oxygen Permeability($cm^3/(m^2 \cdot 24h)$)	Example[a]
Low	4000-40000	PVC 4252, BOPP 113204, PHA 150003, PLA 305005
Medium	400-4000	EVOH wet 787, OPET 1181, PA 6 wt 1972, PET 3543
High	40-400	PVDC 98, PA 6 dry 449
Very high	<40	EVOH dry 3.93