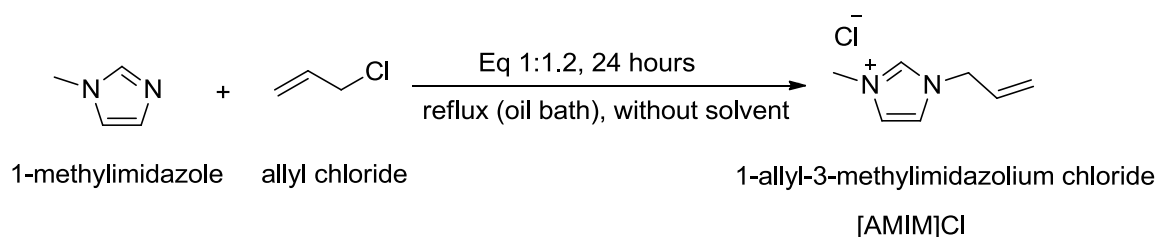


Supplementary Information

Preparation of ionic liquids

1-allyl-3-methylimidazolium chloride [AMIM]Cl was prepared according to the literature¹



Scheme S1. Preparation of [AMIM]Cl

Allylchloride (30.8 ml, 0.378 moles) and *N*-methylimidazole (25.1 ml, 0.315 moles) were inserted in a three neck round bottom flask via a syringe. The three neck round bottom flask equipped with a reflux condenser and a magnetic stirrer was flushed with nitrogen for 10 mins beforehand. The mixture was stirred at 50°C to 60°C for 24 hours. Evaporation of excess allylchloride under *vacuo* gave the product, a viscous liquid (**Scheme S1**) displaying a slight amber colour (48.695 g, 97%); ¹H NMR (ppm, 400 MHz, CD₃OD) δ_H: 9.00 (1H, s, ArH), 7.62 (2H, s, ArH), 6.08 (1H, m, CH), 5.43 (2H, m, CH₂), 4.87 (2H, d, CH₂), 3.96 (3H, s, CH₃); ¹³C NMR (ppm, 400 MHz, CDCl₃) δ_C: 138.0, 132.1, 125.1, 123.6, 121.9, 52.8, 36.6; ES-MS: ES⁺ *m/z* 123.1 [AMIM]⁺. ES⁻ *m/z* 35.1 [Cl]⁻. Water content (Karl Fischer): 16234.ppm

Dissolution of keratin in ionic liquids

Table S1. Solubility of turkey feather in ionic liquids

Ils	Condition/°C	Time/H	Solubility (wt% ± 1)	Appearance
[BMIM]Cl	130	10	50	soluble, viscous
[AMIM]Cl	130	10	50	soluble, viscous
[Choline][thioglycolate]	130	10	45	soluble, viscous
[Bis-2-ethylhexylammonium][thioglycolate]	130	10	-	Insoluble

Regenerated keratin from ionic liquids

Table S2. Mass of regenerated turkey feather from dissolution in ionic liquids

Ils	Mass of turkey feather dissolved (mg)	Mass of regenerated turkey feather (mg)	Mass of regenerated turkey feather (% \pm 1)
[BMIM]Cl	500.0	293.5	59
[AMIM]Cl	500.0	287.2	57
[Choline][thioglycolate]	450.0	230.1	51
[Bis-2-ethylhexylammonium][thioglycolate]	-	-	-

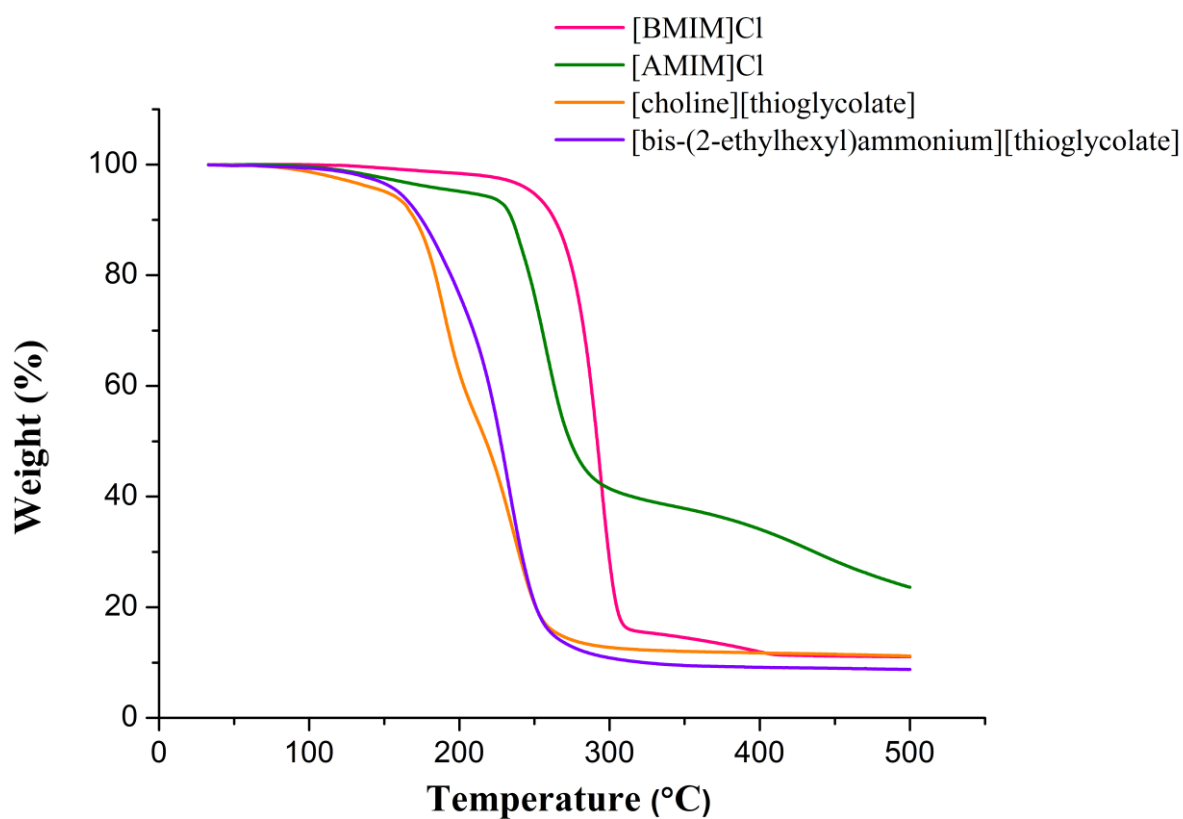


Figure S1. Single heating scan TGA traces of neat ionic liquids