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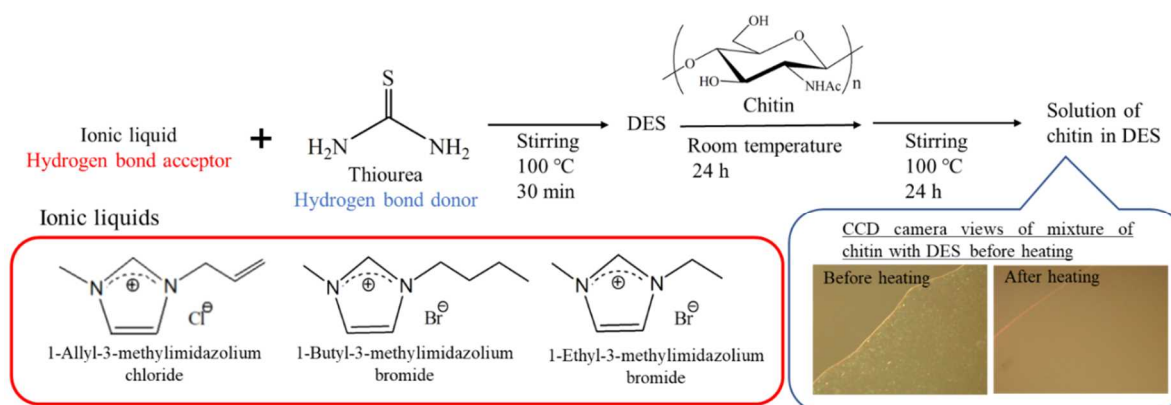
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Dissolution and Composite Preparation of Chitin Using Deep Eutectic Solvents

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Abstract

Chitin is a natural polysaccharide abundantly present on the earth, and thus, very important biomass resource. However, because it has high crystallinity due to strong intra- and intermolecular hydrogen bonding, its solubility and processability are poor, leading to hardly utilization. On the other hand, ionic liquids have been identified as powerful solvents for polysaccharides with poor solubility. We have already reported that an ionic liquid (IL), 1-allyl-3-methylimidazolium bromide, dissolves chitin in concentrations up to 4.8 wt% [1], but the color of the solution is blacked, owing to the presence of bromide. On the other hand, deep eutectic solvents (DESs), analogs of ILs, are attracting attention as good solvents for natural polysaccharides [2]. In this study, we found that DESs composed of various imidazolium ILs and thiourea as hydrogen bond accepters and donor, respectively, dissolved chitin in 2~5 wt% (Scheme 1) [3]. Furthermore, regeneration of chitin from solutions in AMIMCl/thiourea DES (1:0.5) with additives resulted in the formation of films, which were fabricated from highly entangled nanofibers as the SEM images supported.



Scheme 1. Dissolution of chitin in DES composed of imidazolium-based ionic liquids and thiourea.

References

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