Screen the best ionic liquids for keratin dissolution by using COSMO-RS

Liu, Xue; Nie, Yi; Zhang, Suojiang; Skov, Anne Ladegaard

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Screen the best ionic liquid for keratin dissolution by using COSMO-RS

Xue Liu\textsuperscript{(1)(2)}, Yi Nie\textsuperscript{(2)}, Suojiang Zhang\textsuperscript{(2)*}, Anne Ladegaard Skov\textsuperscript{(1)*}

(1) Danish Polymer Centre, Department of Chemical and Biochemical Engineering, Technical University of Denmark, Kgs. Lyngby, Denmark;
(2) CAS Key Laboratory of Green Process and Engineering, Institute of Process Engineering, Chinese Academy of Sciences, Beijing, China;
Most PDMS used in tissue engineering applications are nonpolar, inert and highly hydrophobic, which lead to the low biocompatibility and interaction responses between implantations and cells.

Structure of keratin and application of keratin in elastomer

Structure of keratin

- Keratin molecules have many inter- and intra-molecular strong bonds and also have no regular repeating units, which lead to it difficult to be dissolved by traditional solvent.
- Keratin has the special amino acid sequence for cell adhesion, which can increase susceptibility to bio-decomposition.
- Keratin can improve the mechanical properties of composites.

Application of keratin in elastomer

It is nevertheless a challenge to identify the best ILs for keratin dissolution;
Experimental measurement of all these systems is not practically feasible;
A rapid and a priori screening method to predict the keratin solubility capacity for ILs is needed

**Properties of ILs**
- High chemical stability and thermal stability
- Wider liquid state, Non-volatile
- Low vapor pressure
- Tunable structure and properties
- Wide electrochemical windows
- High electrical conductivity

**Advantages of ILs in dissolving keratin**
- Higher solubility
- It can be recycled with high recovery rate
- Less damage to keratin structure
- Tunable structure and properties

**Study of keratin dissolution in ionic liquids**

<table>
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<th>Author</th>
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</table>
Screen the best ionic liquid for keratin dissolution by using COSMO-RS

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(2) CAS Key Laboratory of Infin Process Engineering, Institute of Process Engineering, Chinese Academy of Sciences, Beijing, China.

Abstract

Keratin dissolution in ionic liquids is an emerging research area of great importance for (bio)technological applications, such as biorefineries, biobased materials and food sciences. However, the knowledge on keratin dissolution in ionic liquids is limited. This study aimed to evaluate the solubility of keratin in a series of ionic liquids using the COSMO-RS method. The results showed that 1-ethyl-3-methylimidazolium tetrafluoroborate (EMITFB) was the best ionic liquid for keratin dissolution, followed by 1-ethyl-3-methylimidazolium chloride (EMICT). The solubility of keratin in EMITFB and EIMICT was close to the critical solution temperature (CST) of the ionic liquid, indicating the possibility of keratin dissolution at a relatively low temperature.

1. Application of keratin in elastomeric materials

2. Structures of 11k and keratin models in this study

3. Predict result

4. Conclusions and Advances

Acknowledgements

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