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

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Publication date:
2018

Document Version
Peer reviewed version

Citation (APA):
Application of PDMS in tissue engineering

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


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

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Keratin dissolution in ionic liquids

Ionic liquid (IL) is a salt in which the ions are poorly coordinated, which results in these solvents being liquid below 100°C, or even at room temperature.

### 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

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.

### Study of keratin dissolution in ionic liquids

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1. Application of keratin in elastomer materials
2. Structures of ISS and keratin models in this study
3. Predict result
4. Conclusions and Advances

Acknowledgments and References

The authors gratefully acknowledge the National Natural Science Foundation of China (NSFC, Chinese Academy of Sciences (CAS))...