

Short chain U(600) di-urea cross-linked poly(oxyethylene)/siloxane ormolytes doped with lanthanum triflate salt

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Abstract

Promising La³⁺-doped electrolytes based on a hybrid poly(oxyethylene)/siliceous host matrix, U(600), have been produced. The organic and inorganic components of the hybrid structure are covalently bonded through urea linkages. The low molecular weight of the polyether U(600) segments is thought to be responsible for the total amorphous character and relatively high room temperature conductivity ($1 \times 10^{-4} \text{ Scm}^{-1}$) of these ormolytes.

Conclusion

Totally amorphous sol-gel derived ormolytes with a wide range of salt concentration have been characterized. The use of the hybrid U(600) di-ureasil host structure instead of poly(oxyethylene) resulted in materials with improved mechanical and thermal characteristics. In addition, a remarkable enhancement of ionic conductivity levels at temperatures lower than 60° resulted. The composition of the electrolyte with optimum conductivity was identified as about $n = 40$.

The formation of a network by bonding relatively low molecular weight chains to a siliceous micro-domain gave rise to a completely amorphous material which is flexible, slightly hygroscopic network with good thermal stability.