Development of Nanocellulose Proton-Conducting Membranes for Applications in Hydrogen Fuel Cells

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論　文　審　査　の　結　果　の　要　旨
Thesis Review Result Summary

In this thesis, the candidate outlined results pertaining to the use of nanocellulose as an alternative to Nafion proton electrolyte membranes. In particular, cellulose nanofibers and cellulose nanocrystals were compared and the effect of crosslinking with sulfosuccinic acid were investigated. The microstructure, chemical structure, mechanical properties and conductivity of the membranes were characterized by various techniques.

Overall, the examiners found that the thesis was well organized, well written, and comprehensive in its structure. The results achieved were impressive, inparticualr the improvement in mechanical properties and conductivity with crosslinking.

Minor demerits were the lack of clear motivation for crosslinking in the presentation, some important forms of characterization were missing, and the extent to which crosslinking reaction was successful was not clearly answered. However, these points can be dealt with in future publications.

Overall the recommendation is that the candidate can pass the doctoral defense and graduate.

よって、本論文は博士（工学）の学位論文に値するものと認める。