

Vita

Candidate's name: Chun Keat Khor

Universities
Attended: University of New Brunswick (2021)
Bachelor of Science

University of New Brunswick (2022)
Masters of Science

Publications/Conference Presentations:

N. A. Richard, C. K. Khor, S. M. Hetherington, S. L. Mills, A. Decken, C. A. Dyker. Iminophosphorano-Substituted Bispyridinylidenes: Redox Potentials and Substituent Constants from Tolman Electronic Parameters. *Chem. Eur. J.*, 26, 17371– 17375 (2020).

15N Chemical Shifts as a Predictor of the Relative Strength of Bispyridinylidene (BPY) Organic Reducing Agents. Science Atlantic ChemCon, Wolfville, Nova Scotia.

Alkaline Polymer Electrolyte with Sub-Zero Conductivity for Zinc-Air Batteries

UNIVERSITY OF NEW BRUNSWICK

THESIS DEFENCE AND EXAMINATION

in Partial Fulfillment

of the Requirement for the Degree of
Master of Science

by

Chun Keat Khor

in the Department of Chemistry

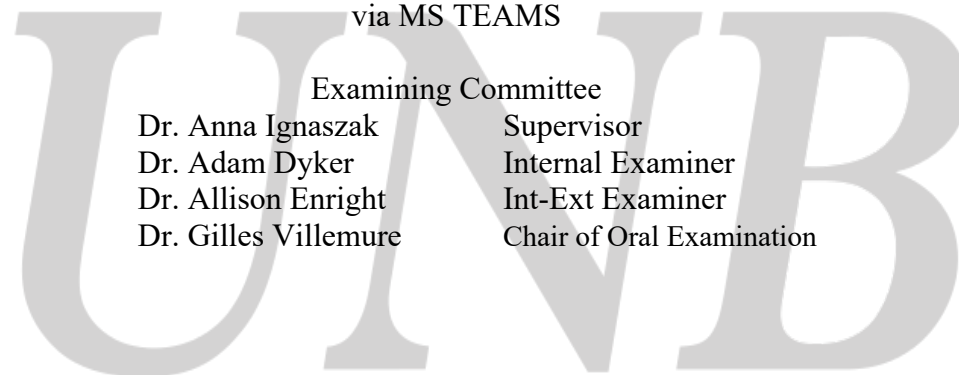
U.N.B., Fredericton, N.B.

**Tuesday, July 19th, 2022
10:30 a.m.**

via MS TEAMS

Examining Committee

Dr. Anna Ignaszak	Supervisor
Dr. Adam Dyker	Internal Examiner
Dr. Allison Enright	Int-Ext Examiner
Dr. Gilles Villemure	Chair of Oral Examination



Abstract

Due to the increasing demand for flexible electronics that can function in harsh environments, research on flexible solid-state batteries, especially zinc-air batteries (ZAB), is expanding. However, the electrolyte in the current commercially available ZAB still suffers from drying out after prolonged exposure to air. Here, the synthesis of a flexible conductive hydrogel electrolyte that can function at low temperatures was attempted. The polymer chain was made up of potassium polyacrylamide-co-acylate and crosslinked using N,N'-methylenebisacrylamide. Three variants of cellulose were added to improve the stretchability of the hydrogel. We found out that acrylamide decomposed in the high concentration of base required for ZAB electrolyte. Further understanding of the polymer chains had helped improve

our hydrogel design, which can tolerate high molarity of base and functions at -23°C . Electrochemical studies were carried out to understand the charge transport properties of the electrolyte in the hydrogel.