

Abstract Submitted
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**Morphology
and Transport Properties of Phosphonium-containing Styrenic Ionomers
with Random Charge Placement** RICK BEYER, KRISTOFFER STOKES¹,
JOSHUA ORLICKI, Army Research Laboratory, Aberdeen Proving Ground, MD,
YUESHENG YE, YOSSEF ELABD, Drexel University, Philadelphia, PA — Alka-
line fuel cell (AFC) technology is currently of interest for portable power supplies
due in part to the use of less expensive non-noble metals (nickel, iron, cobalt) as
the catalyst material. Wide-spread use of the AFC has been prevented by the use
of aqueous KOH as the liquid electrolyte, easily poisoned by CO₂. Development of
an semipermeable polymeric alkali anion exchange membrane (AEM) would signif-
icantly improve the usefulness of AFCs. We have synthesized a series of random
copolymers of styrene and p-vinylbenzyl-trimethylphosphonium chloride, via RAFT
polymerization. Detailed ¹H-NMR analysis of the polymerization conditions allowed
us to refine our approach and generate materials with random monomer addition.
¹H-NMR was also used to quantify ion contents, which range from 15 mol% to 100
mol%. In this presentation, we will review the synthesis and characterization of
these novel cationomers, and then report on their anion transport characteristics
and morphological behavior as characterized via SAXS and TEM.

¹Current affiliation: Celgard, LLC

Rick Beyer
Army Research Laboratory, Aberdeen Proving Ground, MD

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