

'Polymeric Ionic Liquid/Carbon Black' composite
as a green supporting electrolyte

Seung Joon Yoo* and R. Daniel Little

Department of Chemistry & Biochemistry
University of California, Santa Barbara
Santa Barbara, CA 93106-9510

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With the importance of “*green and sustainable*” chemistry continuing to grow and be appreciated, electroorganic synthesis has gained greater attention as one of the most environmentally friendly approaches for organic synthesis (1). However, it does require the use of large amounts of supporting electrolyte in order to provide sufficient ionic conductivity; frequently this causes separation and waste problems following the electrolysis.

In an effort to overcome these problems, and to devise a solution that will have broad applications in organic synthesis, we have designed, synthesized and are testing a new recyclable “*polymeric ionic liquid (PIL) and carbon black composite*” as a surrogate for conventional supporting electrolytes. Our “*composite*” combines the features of a PIL to serve as an electrolyte, and the properties of the Super P[®] carbon black to generate a dispersion (2). Hence, it enables one to perform an electrolysis without additional supporting electrolyte, and to efficiently recover and reuse the composite in subsequent electrolyses.

In the first part of this presentation, a variety of electrochemical oxidations of aromatic alcohols will be described using the “*composite*” in an effort to demonstrate its reusability as well as the nature of the workup procedure for the use of the composite.

We have chosen a unified approach to synthesis wherein analytical electrochemical investigations focusing upon the kinetics of mass transport and heterogeneous electron transfer rates have been incorporated in an effort to establish a comprehensive view of the role played by the composite.

In the second part of the presentation, our efforts combining electro-analytical and spectroscopic techniques, e.g., voltammetries and pulsed gradient spin echo NMR, to investigate diffusion rates and electron transfer rates (3) will be presented to establish the scope of the chemistry and to compare the behavior of the composite with conventional supporting electrolytes and with PIL itself as an electrolytic system.

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