

## CBC SEMINAR ANNOUNCEMENT



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Tokyo Institute of Technology

### Electrochemical Synthesis of Organofluorine Compounds Toward Green Sustainable Chemistry

Organofluorine compounds have distinctive chemical, physical, and biological properties. Recently, there has been increasing interest in the chemistry of organofluorine compounds, which have applications in a wide variety of fields such as material science and medicinal chemistry. However, their preparation is not so easy. Therefore, we have developed selective molecular conversion of organofluorine compounds and selective fluorination of organic heteroatom compounds including heterocycles by using electrochemical methods. We have also developed VOC-free selective electrochemical fluorination of organic molecules and conducting polymers in ionic liquid HF salts.<sup>1)</sup>

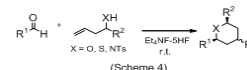
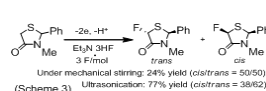
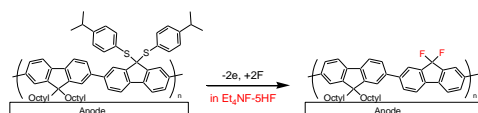
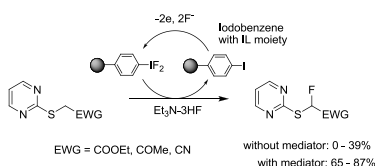
**1) Anodic  $\alpha$ -Methoxylation and  $\alpha$ -Acetoxylation of Trifluoroethyl Sulfide Using Recyclable Solid-Supported Bases:** Selective anodic  $\alpha$ -methoxylation and  $\alpha$ -acetoxylation of trifluoroethyl sulfide was achieved using recyclable solid-supported bases.<sup>2,3)</sup>

**2) Mediatory Use of Task-Specific Ionic Liquid for Selective Anodic Fluorination:** A task-specific ionic liquid having iodoarene was prepared and it was successfully used as a mediator for anodic fluorination and fluorodesulfurization in ionic liquid fluoride salts (Scheme 1).<sup>4,5)</sup> Both the mediator and ionic liquid fluoride salt were repeatedly used for the fluorination.

**3) Selective Anodic Fluorination of Polymer in Ionic Liquid:** Although it is quite difficult to carry out "Polymer Electrochemical Reaction", we have achieved selective anodic fluorodesulfurization of poly(fluorene) derivatives in ionic HF salt as shown in Scheme 2.<sup>6)</sup>

**4) Selective Anodic Fluorination Under Ultrasonication:** High viscosity of ionic liquids causes extremely slow mass transport of substrates to the surface of electrode, which results in low fluorination efficiency. However, we found that ultrasonication markedly increased the yield and changed product- and stereoselectivity (Scheme 3).<sup>7)</sup>

**5) Anodic Fluorination Using Metal Fluoride Salts:** Anodic fluorination of heteroatom compounds was successfully carried out for the first time using metal fluoride salts like KF in tetraethylene glycol/MeCN.<sup>8)</sup> In addition, "Prins Cyclization in Ionic Liquids" will be mentioned (Scheme 4).<sup>9)</sup>



**Date:** 29<sup>th</sup> February 2012 (Wednesday)  
**Time:** 11am – 12.30pm  
**Venue:** NTU SPMS CBC Building Level 2,  
Conference Room  
**Host:** Professor Loh Teck Peng