Biiphasic hydrogen peroxide generation with vegetable oils, lithium battery waste, or Ag based nanoparticles employed

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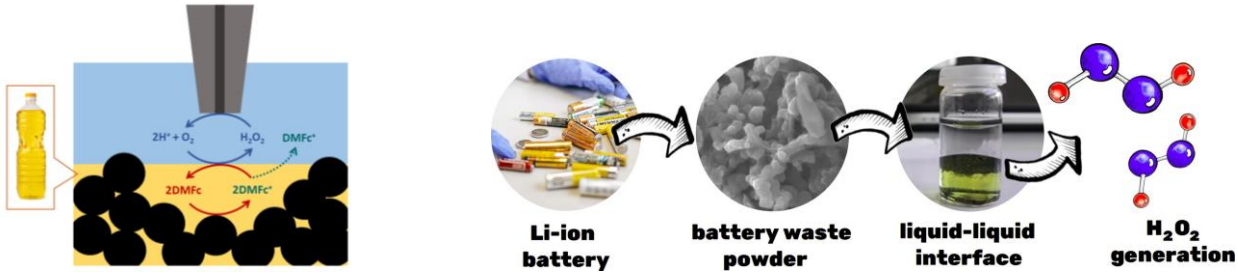
Biphasic ORR attracts attention of researchers in more than 20 years and H_2O_2 was detected as reaction product in majority of the studies.[1,2]. Still there is a quest for new solvents and new ORR catalyst assembled at liquid|liquid interface. Until now polar solvents immiscible with water, starting from 1,2 dichloroethane[3,4] (DCE) and later with trifluorotoluene[5] (TFT) were employed as organic phase. Biphasic ORR was also demonstrated at hydrophobic ionic liquid|H_2O interface.[6] In order to increase efficiency of biphasic ORR noble metal nanoparticles[7] or graphene[8] were assembled at liquid|liquid interface. Their catalytic activity)was attributed to electronic conductivity of assembled film.[9] Recently, we have shown that biphasic H_2O_2 generation is by one order of magnitude more efficient, when leached lithium battery is assembled at liquid|liquid interface.[10]

We will demonstrate application of nonpolar solvents, namely vegetable (rapeseed, linen and sunflower oil) to H_2O_2 generation in conditions when electron donor is electrochemically regenerated in organic phase using carbon paste electrode as a tool. Hydrogen peroxide was detected by scanning electrochemical microscopy. The same method was employed for H_2O_2 detection next to lithium battery waste assembled at TFT|H_2O interface. We have also detected the same product at Ag nanoparticles assembled at the same interface, whereas $AgSb_3$ or AgS nanoparticles do not exhibit such effect.



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