Studies about Ecological Batteries and Depolarizers

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My research regards some of the main developments in the electrochemical field. We tried to use sodium hypochlorite as a depolarizer for batteries. The depolarizer is fundamental for the correct operation of the battery, both from the point of view of f.e.m. and of power. Typical batteries use heavy metal-based depolarizers (e.g. vanadium, manganese and mercury compounds), which are harmful for the environment. We studied the possibility to employ sodium hypochlorite as an ecological alternative to such chemical compounds as NaClO is synthesized in a much more ecological way than many other ordinary depolarizers are. The employ of sodium hypochlorite is very promising especially in the redox flow batteries. In our batteries we used different types of solutions combining sodium hypochlorite, sodium chloride, sodium hydroxide, hydrogen peroxide and sodium dichloroisocyanurate (solid) in several concentrations. Sodium dichloroisocyanurate can combine the advantages of sodium hypochlorite (high f.e.m., ecosustainability) with a more convenient physical form (it is solid while hypochlorite is in solution). To analyze the results we took into account the level of the alteration of the cathodic foil, the maximum f.e.m. reached by the cell, the distance between the two electrodes and the surface of cathode and anode immersed in the solution. In the future, we will try to set up also another form of “green battery” i.e. Microbial Fuel Cells. Microbial Fuel Cells use the electrons produced during the oxidative catabolism of glucose by microorganisms (in particular yeast) to generate useful work by flowing inside a wire. This type of cell is still in phase of development and it is interesting because it allows us to create current from the decomposition of organic wastes.

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