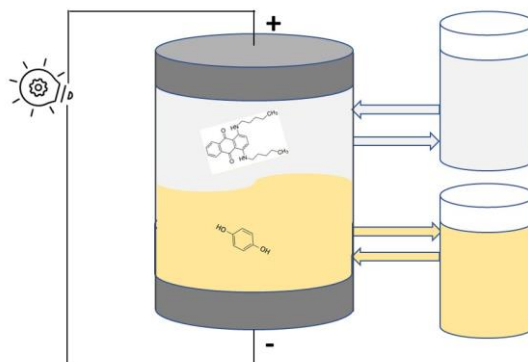


# ADVANCED ORGANIC REDOX CELLS FOR ELECTRICITY STORAGE

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Project Mestrado Bolonha Engenharia Química

Project MEGE



The Energy Transition towards the use of renewable energy sources is an urgent challenge. The intermittency of these sources makes them depend on reliable and cost-effective electricity storage systems. Lately, the concept of flow batteries, which leave reactants and products stored outside the cell, making power and capacity mutually independent, has raised much attention. A further innovation in this path is the concept of a membrane-free battery, in which the cathodic and the anodic reactants are dissolved in mutually immiscible electrolytes, excluding the need of the expensive separator membrane <sup>1</sup>.

Project objectives:

- To prove the concept and test one redox couple system, with an aqueous phase and an organic phase. Tentatively, the system chosen is based upon hydroquinone and *Oil Blue N* as redox reactants, dissolved in mutually immiscible electrolytes.
- To build and test a membrane-free redox flow cell and test it using electrochemical techniques.

Working plan:

- Testing the solubility of the redox species in a set of selected solvents
- Proving the concept of the battery by measuring the potentials and the polarization behaviour of each half-cell (cyclic voltammetry)
- Selection of the electrode materials and design of the cell.
- Testing of the cell

[1] P. Navalpotro, N. Sierra, C. Trujillo, I. Montes, J. Palma, R. Marcilla, *ACS Appl. Mater. Interfaces*, 10 (2018) 41246–41256.

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