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## Organic Radicals for Symmetric Redox Flow Batteries

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# STELLINGEN

Behorende bij het proefschrift

## Organic Radicals for Symmetric Redox Flow Batteries

Jelte Siebren Steen

1. No explanation is without objections. One should always keep an open mind and gather all possible evidence before reaching a conclusion.
2. Degradation of the supporting electrolyte is often overlooked as the reason for battery failure, though in some instances it could play a major role. - *Chapter 5*
3. Regarding the synthesis of water-soluble molecules, final-stage instalment of the water-solubilizing moiety is beneficial to avoid complications with purification throughout the synthetic route. - *Chapter 4*
4. As a PhD is a 9 to 5 job, a healthy work-life balance should be encouraged by both the University and PIs, thus planning lectures and meetings outside of working hours is undesirable.
5. In view of scientific transparency and openness, all academic publishers must retrospectively translate articles written in native languages to English as this is the current dominant *lingua franca*.
6. Physical rebalancing is needlessly complicated when investigating compositionally symmetrical cells (i.e., 1:1 mixtures of posolyte and negolyte materials)<sup>1,2</sup>: the same result can be achieved by simple polarity inversion.  
<sup>1</sup> Liang, Z. *et al. ACS Appl. Energy Mater.* **2021**, *4*, 5443.  
<sup>2</sup> Small, L. J. *et al. J. Electrochem. Soc.* **2019**, *166*, A2536.
7. The synthetic effort of covalently linking posolyte and negolyte fragments ('combi-molecules') is not worthwhile. Compounds that are intrinsically bipolar are the way to go. - *Chapter 3*.
8. Reporting a novel charge-storage material but making no mention of its chemical stability nor its capacity retention during battery operation is unacceptable.  
Huang, J. *et al. Angew. Chem.* **2021**, *60*, 20921.
9. Direct comparison between decomposition rates of pure samples in homogeneous solution with capacity decay in a battery is often complicated by a difference in conditions of these experiments.<sup>3,4</sup> A promising approach to bridge said experiments is by implementing *in situ* characterization methods, such as online <sup>19</sup>F NMR spectroscopy,<sup>5</sup> to gather insight at the molecular level during battery operation.  
<sup>3</sup> Stability studies of *Chapter 2*.  
<sup>4</sup> Alkhayri, F. *et al. J. Electrochem. Soc.* **2021**, *168*, 070501.  
<sup>5</sup> *Chapter 5*.