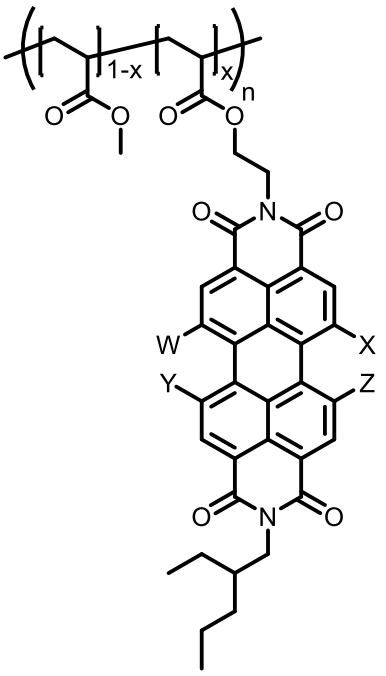
Polymer bound perylenes.

Perylenebisimides (PBIs) are electron-deficient molecules that are easily reduced and can be employed for the construction of batteries. PBIs may act as the electroactive element in the negative electrode of alkali ion batteries to undergo the reaction PBI + 4 M^+ + 4e^- ↔ PBI $^{4-}$ M^+_4.[1] The major requirement for this application is that the PBIs are immobile, stay at the electrode and do not dissolve in the electrolyte. For that reason, we recently attached PBIs to a polyacrylate backbone and have proven that these polymers are excellent electrode materials.[2] Here we propose the development of novel perylene containing polymer electrode materials. We aim at polymers with high stability, high perylene loadings (x in the Figure) and tuneable electrochemical properties. We intend to tune electrochemical properties by systematic variation of the bay substituents W-Z.

This project is mainly experimental. Organic and polymer synthesis will be combined with electrochemical characterisation of the materials. The latter in combination with the battery group at the RST. As a BSc project, the work will be mainly focused on synthesis. As a MSc project synthesis and electrochemical characterization will be more balanced.



[1] Perylene-Based All-Organic Redox Battery with Excellent Cycling Stability. Iordache, A.; Delhorbe, V.; Bardet, M.; Dubois, L.; Gutel, T.; Picard, L. *ACS Appl. Mater. Interfaces* **2016**, *8*, 22762−22767.
[2] Pierre Ranque, Erik Kelder, Wolter Jager, *Manuscript in preparation*.