Toward all organic Li-ion batteries
Study of polycarboxyl materials
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Main goal : Synthesis, characterization and study of the electrochemical properties of organic compounds, able to act as electrodes for Li-ion batteries.

- Energy storage (using batteries) constitutes one of the main columns to renewable energies and make part of our well-being (portable electronic devices, hybrid electric vehicles (HEV) and electric vehicles (EV)).
- Li-ion batteries constitute an attractive technology for electricity storage. However they are based on the use of non renewable electroactive materials (e.g. LiCoO₂, LiNiO₂, LiFePO₄).
- The life cycle analysis of such inorganic-based electrode materials (extraction, processing and recycling) shows a negative impact on the environment.
- A more "sustainable" Li-ion battery could be foreseen in the synthesis of new active materials produced from organic renewable resources and via eco-efficient processes

Piperazine tetrones
- Use of carbonyl (C=O) groups as RedOx centers and influence by the incorporation of nitrogen atom in the ring.
- Synthesis of diallyl-piperazine tetrone³ (AP) and oligomer (p-AP) via Acyclic Dien Metathesis (ADMET).

Diquinoxalino phenazine
- Use of pyrazine ring as a RedOx center.

Conclusions and perspectives
- Carbonyl RedOx potential can be tuned.
- Materials tested display low polarization and good average potential.
- Main drawback of organic compounds is the solubility in the electrolyte, but it can be solved by increasing the molecular weight (polymers) or increasing the negative charge (lithium salts).